

# creative computing®

Computers  
And People

August 1983  
Vol. 9, No. 8  
\$2.95

*the #1 magazine of computer applications and software*

## **In-Depth Evaluations:**

- TRS-80 Model 10C
- Texas Instruments CC-40
- Mattel Aquarius
- Information Master
- Word Plus—PC
- HomeBrain
- The Eye

## **The Heartbreak Of Cyberphobia**

## **Marriage In The Computer Age**

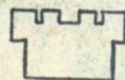
## **Are You A Creative Person?**

## **Report From NCC '83**

## **New: Street Price Index**

## **Home Control**

## **Computer Ethics**



CASTLE COMMUNICATIONS  
1720 E. MICHIGAN AVE.  
LANSING, MI 48912  
(517)-371-4321

# THE REMARKABLE SV-318 PERSONAL COMPUTER

You'll grow into it, not out of it.



© 1983 SPECTRA VIDEO, INC.



## SV-601 SUPER EXPANDER

The real value in any computer system lies in its ability to accommodate a large variety of input/output devices simultaneously. With the addition of the SV-601, the SV-318 can interface with as many as seven different devices at one time. Although lightweight, the SV-601 can support a 15" T.V. monitor. Special front view slots have been designed to monitor the operation of the different interface cards that are connected to the system.



## SV-903 DATA CASSETTE

This feature packed data cassette draws power from the SV-318, to which it is connected. By using a stereo head, you can store data on one channel, and voice or sound on the other. This greatly enhances the usage of stored data. Programs such as foreign language tutorials and voice assisted training can be stored and data stored. The data cassette will be an integral part of your system even if you choose to expand into a disk drive. The cassette even has a built-in condenser microphone so you can write your own voice support programs.

# ABLE COMPUTER: out of it.



Man has only recently tested the waters of the home computer age, and he has found the waters to his liking. But with a brain capable of storing several trillion bits of information, he will be continually pushing his new found toy to greater limits. Will his machine live up to this challenge?

Sadly, many personal computers will become tomorrow's junk in the attic. The SV-318 is one that will not. Because as you get better, it gets better. It does so because of its capability and expandability—both far beyond those of any other affordable computer.

**CAPABILITY.** The SV-318 isn't just more capable. It's much more capable. No other computer at even twice the price combines all these extraordinary features: 32K ROM expandable to 96K; 32K RAM expandable to 144K; Extended Microsoft Basic (the industry standard); even Standard CP/M 80-column capability so you can immediately utilize over 10,000 existing software programs. The SV-318 also has a unique built-in joystick/cursor control—an immeasurably useful feature when it comes to playing your favorite video game.

**EXPANDABILITY.** As you become more and more skillful with computers, you'll love how the SV-318 "stretches" to meet your demands (and actually leads you in fascinating, new directions). For one thing, all eleven of our important peripherals are available immediately. With most other models, you have to wait months. For another, the SV-318 is beautifully designed to interface with new options as they become available.

**AFFORDABILITY.** The SV-318 is not only eminently affordable, it's the first true bargain of the computer age! Besides home budgeting, business applications, word processing, programming and self-teaching, the SV-318 is the best entertainment value in town. Not only can you use it with your TV to play hundreds of different video games, you can also use your SV-318 with a TV as a drawing tablet or music synthesizer. In play, as in work, the SV-318 will continually expand to meet your potential.

Whether you're just wetting your toes in computers, or fully afloat on the waters, the SV-318 is a computer that will serve you for many, many years. You see, we believe that even in the computer age, you don't become an object of real value unless you're around for a while.

## FOR UNDER \$300

SPECTRAVIDEO SV-318 COMPUTER COMPARISON CHART						
	SPECTRAVIDEO SV-318	APPLE II PLUS	ATARI 800	COMMODORE 64	NEC 6001	RADIO SHACK COLOR COMPUTER
BASE PRICE	\$299	\$1,540	\$899	\$595	\$399	\$299
COMPUTING POWER FEATURES						
BUILT-IN ROM	32K	12K	10K	20K	16K	8K
EXPANDABLE TO	96K	N/A	42K	N/A	32K	16K
BUILT-IN EXTENDED MICROSOFT® BASIC	YES	YES	ADDITIONAL COST	NO	YES	ADDITIONAL COST
BUILT-IN RAM	32K*	48K	16K	64K	16K	4K
EXPANDABLE TO	144K**	64K	48K	N/A	32K	16K
KEYBOARD FEATURES						
NUMBER OF KEYS	71	51	61	66	71	55
USER DEFINE FUNCTIONS	10	N/A	4	8	10	NONE
SPECIAL WORD PROCESSING	YES	NO	NO	NO	NO	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	NO	YES	YES	NO	NO
UPPER/LOWER CASE	YES	UPPER ONLY	YES	YES	YES	YES
GAME/AUDIO FEATURES						
SEPARATE CARTRIDGE SLOTS	YES	NO	YES	NO	NO	NO
BUILT-IN JOYSTICK	YES	NO	NO	NO	NO	NO
COLORS	16	15	128	16	9	9
RESOLUTION (PIXELS)	256 x 192	280 x 160	320 x 192	320 x 200	256 x 192	128 x 64
SPRITES	32	N/A	4	8	N/A	N/A
SOUND CHANNELS	3	1	4	3	3	1
OCTAVES PER CHANNEL	8	4	4	9	8	10
A.D.S.R. ENVELOPE	YES	NO	NO	YES	YES	NO
PERIPHERAL SPECIFICATIONS						
CASSETTE	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	1 CHANNEL	1 CHANNEL
AUDIO I/O	YES	YES	YES	NO	NO	NO
BUILT-IN MIC	YES	NO	NO	NO	NO	NO
DISK DRIVE CAPACITY (LOW PROFILE)	256K	143K	96K	170K	N/A	170K
	YES	NO	NO	NO	NO	NO
CP/M® COMPATIBILITY (80 column programs)						
CP/M® 2.2	YES	NO***	NO	NO****	NO	NO
CP/M® 3.0	YES	NO	NO	NO	NO	NO

TE  
ows its  
handily  
ou can record  
und on the  
e of cassette  
in language  
can be used  
ill continue to  
an if you  
he data  
or mic to help  
grams.



### SV-902 FLOPPY DISK DRIVE

This extremely compact, low profile unit uses standard 5 1/4" flexible diskettes. Its single side double density configuration allows a capacity of 256K bytes of data (unformatted). Linked to the Super Expander, the SV-902 is your key to the virtually unlimited scope of CP/M O/S as well as a complete variety of program languages such as LOGO, PASCAL, FORTRAN, COBOL and PL-1.

## SPECTRAVIDEO™

# SV-318

### PERSONAL COMPUTER

SPECTRA VIDEO INC. 39 W. 37th Street, New York, N.Y. 10018

CIRCLE 261 ON READER SERVICE CARD

\* 16K user addressable plus 16K graphic support  
\*\* 128K user addressable plus 16K graphic support

\*\*\* Apple II can accept modified 40 or 80 column CP/M  
\*\*\*\* Commodore 64 accepts 40 column CP/M

Microsoft is a registered trademark of Microsoft Corporation  
CP/M is a trademark of Digital Research, Inc.

**ANNOUNCING  
THE END OF  
THE DISPOSABLE  
COMPUTER.**

If you guessed that a Practical Peripherals Microbuffer™ printer buffer saves time, you're right. For the way it works, this inexpensive product is the most practical addition to your microcomputer system ever.

With Microbuffer, you don't have to wait for your printer to finish before you resume using your computer. Data is received and stored at fast speeds, then released from Microbuffer's memory to your printer. This is called buffering. The more you print, the more productive it makes your workflow.

Depending on the version of Microbuffer, these buffering capacities range from a useful 8K of random access memory — big enough for 8,000 characters of storage — up to a very large 256K — enough for 256,000 characters of storage.

Practical Peripherals makes stand-alone Microbuffers for any computer and printer combination,

including add-on units especially for Apple II computer and/or Epson printers. Each has different features like graphics dumps and text formatting besides its buffering capabilities. You can choose one that's just right for your system.

Best of all, they're built to last and work exactly like they're supposed to.

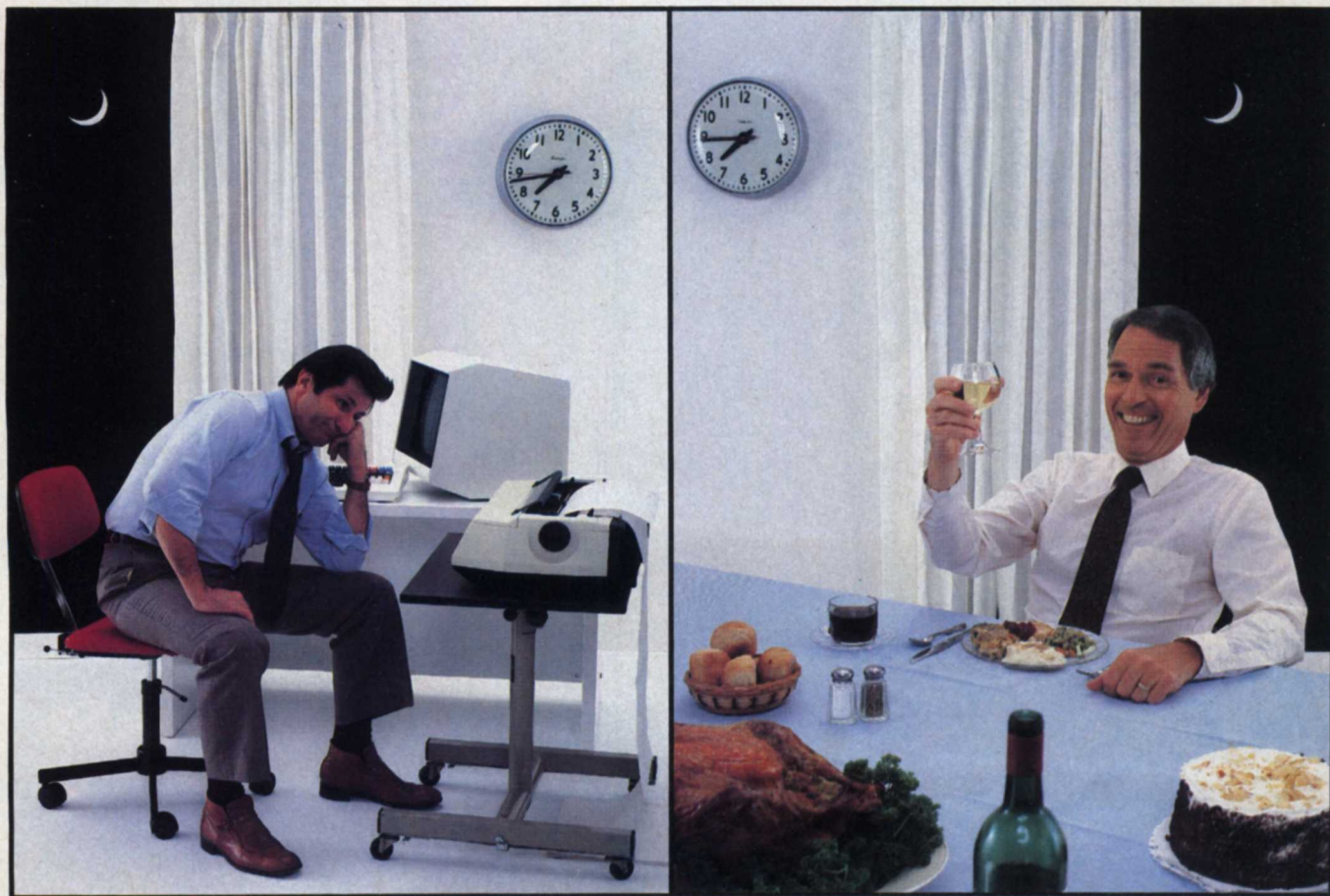
If you're still guessing whether you can afford to have one, talk with any computer dealer. That's the best way to find out how practical a Practical Peripherals Microbuffer is.

**PRACTICAL  
PERIPHERALS**

31245 La Baya Drive  
Westlake Village, CA 91362  
(213) 991-8200

CIRCLE 174 ON READER SERVICE CARD

# GUESS WHO HAS MICROBUFFER.™



# There are incredible things on the horizon from the leader in Personal Computer Software.

# Datasoft

Look what's ahead for you from Datasoft®: the latest games and hottest titles, featuring your favorite characters from TV, the movies, cartoons and the arcades.

Wheel and deal your way through "Dallas"™, with all the intrigue and maneuvering of the hit TV series. You'll have to be as sharp and conniving as J.R.™ to beat it.

Ready for some computer Kung Fu? Then jump feet first into "Bruce Lee"™ for action that's as quick as a karate chop.

Or you can laugh it up with "Heckle and Jeckle"®, or play along with everyone's favorite feline, "Heathcliff"®.

Which games gobbled most your quarters at the arcades last year? "Zaxxon"™, and Datasoft® brings it to you with all the totally unique color graphics and unprecedented 3-

dimensional effects you saw in the arcade version. We also have "Moon Shuttle"®, where you're pitted against all the life-threatening man-o-wars, meteors, bomb launchers and expandos that the Prince of Darkness can hurl at you. And Datasoft is bringing you the game that is quickly becoming one of the hottest challenges in the arcades, "Poo Yan"®.

If you want more than games, Datasoft® has a full line of graphic and home management programs, including Text Wizard,™ Spell Wizard,™ Basic Compiler,™ Money Wizard,™ and Word Wizard.™

If you're looking for games with more action plus high quality and high resolution graphics, look to the leader in personal computer software, Datasoft®. We've got some incredible things on the horizon for you.

## Datasoft®

9421 Winnetka Avenue, Chatsworth, CA 91311 (213) 701-5161

© 1983 Datasoft Inc. © 1983 McNaught Syndicate, Inc.

"Heckle and Jeckle"® is a registered trademark of Viacom International, Inc.

Heathcliff® is a registered trademark of McNaught Syndicate, Inc.

Dallas™ and J.R.™ are trademarks of Lorimar Productions, Inc.

Poo Yan® is a registered trademark of Konami Industries Company, Ltd.

Moon Shuttle® is a registered trademark of Nichibutsu, U.S.A.  
Zaxxon™ and Sega® are trademarks of Sega Enterprises, Inc.  
Datasoft® and Spell Wizard™, Basic Compiler™, Money Wizard™  
and Word Wizard™ are trademarks of Datasoft Inc.

CIRCLE 155 ON READER SERVICE CARD

# issue...in this issue...in this

## evaluations & profiles

- 14 The TRS-80 Model 100**.....Anderson  
The first purely practical portable
- 37 The Texas Instruments CC-40**.....Devlin  
The missing link between calculators and computers
- 49 The Mattel Aquarius**.....Ahl & Linzmayer  
Barbie, bits and bytes
- 58 Electronic Talking Typewriters**.....Gray  
A new one and an old one
- 64 Information Master**.....Harmer  
A very friendly database program for the Apple
- 72 Word Plus—PC**.....Devlin  
An easy-to-learn word processor for IBM
- 78 Learning To Program**.....Murphy  
Programs to help you learn programming
- 100 HomeBrain**.....Hart  
A computer dedicated to home control
- 108 The Eye**.....Moyen-van Slimming  
A home control system for Apple

## articles

- 90 The House Of The Future**.....Laetz  
Complete computer control
- 114 The Heartbreak Of Cyberphobia**.....Anderson  
How to cure it
- 132 Of Marriage In The Computer Age**.....Rossman  
Coping with a cybernetic *ménage à trois*
- 142 Handicapped And Working**.....Morgan  
Computers help handicapped to work at home

**August, 1983**  
**Volume 9, Number 8**



*Creative Computing* (ISSN 0 097-8140) is published monthly by Ahl Computing, Inc., a subsidiary of Ziff-Davis Publishing Company. David Ahl, President; Elizabeth B. Staples, Vice President; Selwyn Taubman, Treasurer; Bertram A. Abrams, Secretary. P.O. Box 789-M Morristown, N.J. 07960. Second Class postage paid at New York, NY 10001 and at additional mailing offices.

Copyright ©1983 by Ahl Computing, Inc. All rights reserved.  
Editorial offices located at 39 East Hanover Ave., Morris Plains, NJ 07950. Phone (201) 540-0445.

Domestic Subscriptions: 12 issues \$24.97; 24 issues \$43.97; 36 issues \$57.97.  
POSTMASTER: send address changes to *Creative Computing*, P.O. Box 5214, Boulder, CO 80321. Call 800-631-8112 toll-free (in New Jersey call 201-540-0445) to order a subscription.

- 146 Getting Away From It All—Almost**.....Gray  
Computer Workshops at Club Med
- 149 Computer Ethics**.....Mueller & Mueller  
Would an intelligent computer have a right to life?
- 156 The Turing Test**.....Ahl  
An historical perspective
- 162 An Esoteric Ethical Excursion**.....Lees  
Free will and robotics
- 164 Herbert Simon Speaks Out**.....Staples  
Computer intelligence: unlimited and untapped
- 170 Profile Of The Creative Individual**.....Raudsepp  
What makes a person creative?
- 180 Randomness And The Mind**.....Schmidt  
Psychic effects in games of chance
- 188 NCC '83**.....Ahl  
Report from the National Computer Conference
- 196 CP/M '83**.....Uston  
Yet another successful show

## departments

- 6 Input/Output**.....Readers
- 10 Street Price Index**.....Ahl  
Who's selling what for how much
- 202 Controller Corner**.....Riley & Riley  
Switch-type joysticks for Atari and Apple
- 212 Print About Printers**.....Anderson  
Anechoic chambers, buffers and the Gemini twins
- 216 Apple Cart**.....Arrants  
Ile upgrades and products for the III
- 220 Outpost: Atari**.....Anderson  
New models from Atari
- 229 Commodore's Port**.....Anderson  
Video resolution and stringy floppies
- 234 IBM Images**.....Glinert-Cole  
DOS 2.0, Cosmic Crusaders and more dirty fingers
- 240 TRS-80 Strings**.....Gray  
Software reviews and a screen saver
- 244 Book Reviews**.....Gray, et al  
If there is one book you don't buy this year...

## staff

**Founder/Editor-in-Chief** David H. Ahl

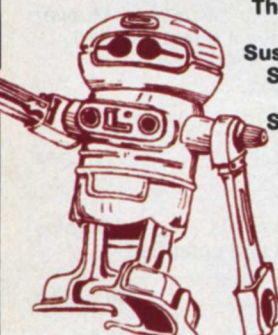
**Editor** Elizabeth B. Staples

**Managing Editor** Peter Fee

**Associate Editors** John Anderson  
Joseph Devlin  
Stephen Arrants

**Editor-at-Large** Ken Uston

**Contributing Editors** Dale Archibald  
Charles Carpenter  
Thomas W. Dwyer  
Will Fastie  
Susan Glinert-Cole  
Stephen B. Gray  
Glenn Hart  
Stephen Kimmel  
Ted Nelson  
Harold Novick  
Peter Payack  
Alvin Toffler  
Gregory Yob  
Karl Zinn



**Staff Writer** Owen Linzmayer

**Copy Editor** Sherrie Van Tyle

**Editorial Assistants** Andrew Brill  
Laura Gibbons

**Art Director** Patrick Calkins

**Assistant Art Director** Chris DeMilia

**Artists** Diana Negri Rudio  
Eugene Bicknell  
Paul Krasner

**Typesetting** Karen K. Brown

**Advertising Director** Claude Shear

**Creative Computing Press** Laura Conboy

**Operations Manager** Patricia Kennelly

**Comptroller** Jennifer H. Shaler

**Accounting** Joanne Sapio

**Retail Marketing** Susan DeMark

**Fulfillment** Frances Miskovich  
Rosemary Bender  
Linda Blank  
Pat Champion  
Elsie Graff  
Linda McCatharn  
Carol Vita  
Jim Zecchin

**Shipping & Receiving** Ronald Antonaccio  
Mark Archambault  
Bill Thomas  
Scott McLeod  
Mike Gribbon  
Strawvey Montgomery

## advertising sales

**Advertising Director**  
Claude Shear  
Creative Computing  
Ziff-Davis Publishing Company  
One Park Avenue  
New York, NY 10016  
(212) 725-3577

**Advertising Coordinator**  
Ruth Darling  
Creative Computing  
Ziff-Davis Publishing Company  
One Park Ave.  
New York, NY 10016  
(212) 725-3446

**Northern California, Northwest**  
Jeff Miller  
Ziff-Davis Publishing Company  
3030 Bridgeway Blvd.  
Sausalito, CA 94965  
(415) 331-7133

**Southern California, Southwest**  
Tom Whiteway  
Ziff-Davis Publishing Company  
3460 Wilshire Blvd.  
Los Angeles, CA 90010  
(213) 387-2100

**New England**  
CEL Associates, Inc.  
27 Adams Street  
Braintree, MA 02184  
(617) 848-9306

**Midwest**  
Jeff Edman  
The Pattis Group  
4761 W. Touhy Ave.  
Lincolnwood, IL 60646  
(312) 679-1100

**Mid-Atlantic**  
Larry Levine  
Ziff-Davis Publishing Company  
One Park Ave.  
New York, NY 10016  
(212) 725-7668

**Southeast**  
Browning Publications  
P.O. Box 81306  
Atlanta, GA 30366  
(404) 455-3430

**Canada**  
The Pattis Group  
1623 Young St.  
Toronto, Ontario M4T 241  
(416) 482-6288

**Consumer Computers & Electronics  
Magazine Division**  
**President:** Larry Sporn  
**Vice President Marketing:** J. Scott Briggs  
**Vice President Circulation:** Carole Mandel  
**Vice President/**  
**General Manager:** Eileen G. Markowitz  
**Creative Director:** Peter J. Blank

## permissions

Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Bette Amado, Ziff-Davis Publishing Company, One Park Avenue, New York, New York 10016.

## where to send it

All editorial material, including article submissions, press releases, and products for evaluation should be sent to:

Creative Computing  
39 E. Hanover Ave.  
Morris Plains, NJ 07950

Correspondence regarding other Creative Computing products and publications should also be sent to the Morris Plains address.

Correspondence related to advertising, including ad copy, questions on billing, and requests for rates, should be sent to:

Advertising Department  
Creative Computing  
Ziff-Davis Publishing Co.  
One Park Ave.  
New York, NY 10016

Correspondence regarding subscriptions, including orders, changes of address, and problems should be sent to:

Creative Computing  
P.O. Box 5214  
Boulder, CO 80321

Your help in choosing the correct address for your correspondence is appreciated. An incorrectly addressed letter or package can take as long as several weeks to reach its proper destination.

## subscriptions

All subscriptions orders and other correspondence related to subscriptions should be addressed to:

Creative Computing  
P.O. Box 5214  
Boulder, Colorado 80321.

Foreign subscriptions must be accompanied by payment in U.S. currency.

Subscription prices:

U.S.	Canada	Foreign
1 year \$24.97	1 year 29.97	1 year 34.97
2 years 43.97	2 years 53.97	2 years 63.97
3 years 57.97	3 years 72.97	3 years 87.97

Airmail delivery on foreign subscriptions is available for a one-year period only at \$75.00 additional for mail to Asia and Australia, and \$50.00 additional for all other foreign.

Subscribers in the United Kingdom may send payment in sterling to:

Hazel Gordon  
10 Bishops Way  
Sutton Coldfield  
West Midlands B74 4XU

Please allow at least eight weeks for change of address. Include old address as well as new—enclosing if possible an address label from a recent issue.

## attention authors

Creative Computing will not be responsible for the return of unsolicited manuscripts, cassettes, floppy disks, program listings, etc. not submitted with a self-addressed, stamped envelope.

**(ALL 248 OF THEM!)**



- Define each key with up to 8 characters of your choice directly from your computer keyboard
- Redefine any key - anytime - for any software program
- Each key is completely user definable without software or disk interaction
- 62 user definable keys (31 lower case/31 shifted) per keyboard
- Stores up to 4 (62 key) keyboards in its own memory
- Switch between keyboards at the touch of a button making all 248 user defined keys available
- KeyWiz is complete - no other parts to buy or PROMs to purchase and does not disable your keyboard

(Very Intelligent Peripheral)

**Send \$3.00 for our informative User Manual**

- ☐ For Apple II+, IIe, Ace\* (others coming) comes with plastic Applesoft Basic Template, Pascal Template and 2 blanks
- ☐ For TRS-80\* Model III comes with 2 Blank Plastic Templates **\$439.00**
- Add \$8.00 for Shipping/Handling

**Also still available - our KeyWiz 83 & Convertible**

Creative Computer Peripherals Inc.

**Aztec Environmental Center**  
1044 Lacey Road, Forked River, N.J. 08731  
**THE BIG NAME IN SMALL COMPUTER PERIPHERALS**

**10 DAY TRIAL WITH  
MONEY BACK GUARANTEE**

### Full 1 Year Warranty

Visicalc is a registered trademark of Visicorp.  
 Apple II is a registered trademark of Apple Computer, Inc.  
 Ace is a registered trademark of Franklin Computer, Inc.  
 TRS-80 is a registered trademark of Tandy Corporation

**ORDERS ONLY 800-225-0091**  
**INFORMATION 609-693-0002**

DEALER INQUIRIES INVITED

**CIRCLE 112 ON READER SERVICE CARD**

# output...input/output...input

## Oh, Hal

Dear Editor:

If a professional programmer made such a glaring error that even the novice could see it, you might question that programmer's credibility. That supposition also extends to book reviews. The reviewer of *2010: Odyssey 2* by Arthur C. Clarke in the May issue may, indeed, be an Arthur Clarke fan and may have read *2001*, but every science fiction hacker worth his/her BEM's (bug-eyed monsters) knows "The Sentinel" was the basis for *2001*, not the novel *Childhood's End*.

Cynthia Cox Yarborough

*Intergalactic egg-on-the-face dept: You are quite right. In 1950, Clarke's short story "The Sentinel" introduced a mysterious artifact on the moon, that later evolved into the monolith of 2001. At the time of the film, 15 years later, Childhood's End was Clarke's most recent work.*

*In The Making of Kubrick's 2001, by Jerome Agel, a number of parallel quotations are cited from Childhood's End. There also appears in the book a 1970 quote from Clarke himself, which bears out, I think, the credibility of my review: "I'll be able to mine the debris from 2001 for years," he said. —JJA*

## Battery Operated Burglars

Dear Editor:

In the May issue, you printed an article by Mr. Kel Hess about using a computer to act as a burglar alarm. While the effort put forward by Mr. Hess was very creative, it suffers from the greatest of defects, namely the loss of primary power.

One of the chief faults in many systems is their inability to continue to operate after sustained loss of primary power. Burglars simply cut the wires and wait for any batteries to run down, then go help themselves.

Above that, you should warn your readers, and Mr. Hess, that almost all 50 states have laws forbidding any automatic devices dialing 911 emergency numbers or any police or fire department phones. The reason is, that the machines don't know when to hang up thus blocking emergency communications. Mr. Hess even designed a repeat call-back feature into his software, which is what most police and fire departments dislike about such systems.

I would strongly suggest, that if you are willing to put out \$3000 for equipment, and are unwilling to pay for insurance, that you should be willing to put out another \$3000 for alarm equipment, because that is what it would cost you to replace the stolen equipment. This way you will only have to do it once.

Bruce D. Anderson  
Brand Consultants  
853 Broadview Dr.  
Lawrence, KS 66044

## Shell Shock

Dear Editor:

Howard Kaplon may have gotten in over his head in the statistical analysis of his data in "A Comparison of Sorts, Revisited," May, 1983.

In Table V, he calculated the population standard deviation, whereas it would have been correct to use the sample standard deviation (N-1 weighting). His reported standard deviations are, therefore, too low.

Furthermore, it doesn't make any sense to average regression constants over samples which contain mostly the same data, as Mr. Kaplon has done.

Finally, although it is obvious that it takes no time to sort no data, the most accurate regression equations are obtained without the constraint that the regression line must pass through the origin.

Mr. Kaplon's Table VI should have been based on a regression of his ten data points, rather than any average:

Shell-Metzner:  $T = .956N^{1/n}N - 502$

Quicksort:  $T = .527N^{1/n}N - 99$

These equations give slightly higher predicted sorting times than Mr. Kaplon's.

In the Quicksort Flowchart in the same article, the initial values of R and W(K) should be the number of items being sorted, not 1 as given.

Edward Berne  
5626 Appleridge Tr.  
West Bloomfield, MI 48033

## Coding Colons

Dear Editor:

I'd like to comment on Wheeler and Peeri's fine cryptography article in the May 1983 *Creative Computing*.

Many readers will doubtless expand the programs to be stored on and read from tape or disk. Problems may arise. Most personal computers use special characters—usually comma and/or semicolon and/or colon—to keep strings straight. Also quotation marks in the wrong place can terminate a string. The chances are good that, if a message is long enough, the randomly generated characters will produce a control character in the wrong place and destroy part of the message.

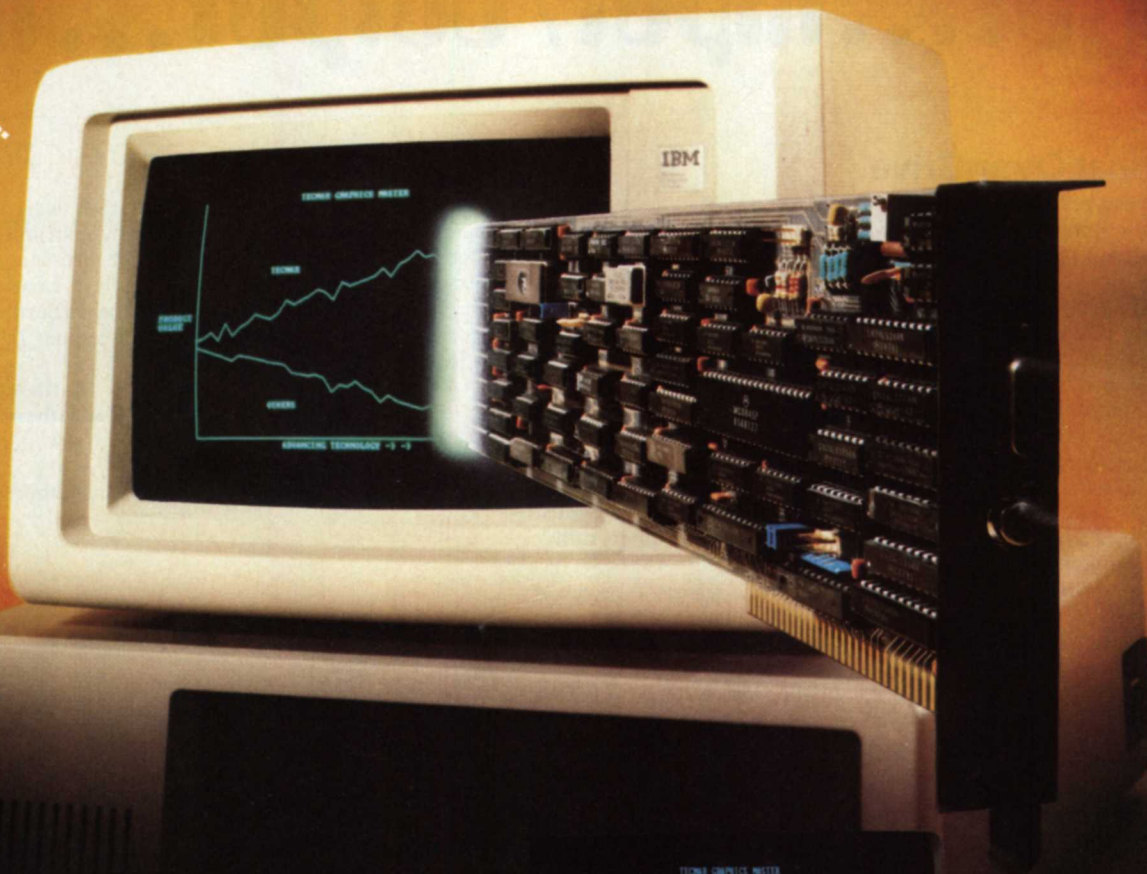
To avoid this problem store the enciphered letters as numbers rather than as characters. A good way to do this is to store everything in an integer array and then read the array onto the storage medium. When the array is read back it can be translated into characters.

George Trepal  
2650 Alturas Rd.  
Bartow, FL 33830

# TECMAR'S GRAPHICS MASTER.™

It adds graphics to your IBM Monochrome Display, or 16 high-resolution colors to your color monitor!

NEW  
IMPROVED!



**Text or high-resolution graphics on the IBM Monochrome Display**

**Amazing new resolutions on standard color monitors**

**Complete emulation of IBM's display adapters**

**On standard low-scan color monitors:**

- 640 horizontal x 400 vertical in 16 colors
- 720 horizontal x 480 vertical graphics in 4 colors.

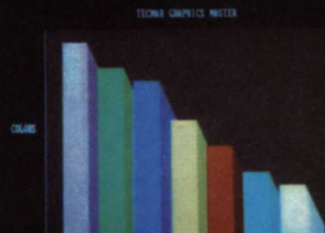
**On the IBM Monochrome Display:**

- 720 horizontal x 700 vertical
  - 25/50 lines of 80 characters
- Graphics Master can do much more. In all, over 30 different display modes can be used on standard monitors, and over 25 on the IBM Monochrome Display.

With certain monitors, you can achieve super-high resolutions like 512 horizontal x 420 vertical in up to 16 colors *without interlace*.

Graphics Master is equipped with a full 128K of on-board display buffer memory. In low-resolution modes, extra memory isn't wasted. You can divide it up into alternate display screens or use it for general data storage.

Graphics Master retains complete compatibility with the IBM Monochrome and Color/ Graphics Adapters. Use it to accompany or replace one or both of the IBM cards.



Graphics Master will run with all IBM software for the Personal Computer, including BASIC's graphics commands.

With Tecmar's Video Cassette Recorder Controller, you can overlay Graphics Master images on videotaped material with an external mixer.

Call or write for further information. Our new address is:

## TECMAR

6225 Cochran Road  
Cleveland, Ohio 44139  
Phone 216-349-0600/Telex 466692

CIRCLE 218 ON READER SERVICE CARD

# output...input/output...input

## Manual Over Drive

Dear Editor:

I am writing about the Color Computer Disk System review I wrote that appeared in the March, 1983 issue of *Creative Computing*. I have received many nice letters and queries regarding the article, and I would like to pass along some information.

Many people asked me how to order the service manual for the disk system, as many store managers are telling them that they are not available. I asked the person from whom I ordered mine, and he passed along the following information.

There are two disk system manuals, one for the drive unit and one for the controller card. The part numbers for the manuals are MS-2603022 and MT-2603022 respectively. If the store manager tells you they are not available, tell him that they must be ordered from Tandy's national parts distribution center, rather than from computer sales.

I apologize for not answering all of the letters I received personally. Postage is too expensive to answer all requests individually. Those who sent a self-addressed stamped envelope got an immediate reply.

One last comment on an error in the disk system operators manual. I stated that the COPY command is not available to users of single drive machines. I have since found out that COPY does work with only one drive. The proper syntax for single drive operation is COPY filename/ext. You will be prompted as to when to switch disks. COPY is non-destructive of a program in memory, unlike BACKUP and DSKINI.

John Steiner  
508 Fourth Ave. NW  
Riverside, ND 58078

## Convention Corrections

Dear Editor:

Some warnings are appropriate for potential users of the program given in "Financial Analysis For The Apple II" (Feb. 1983, pp. 188-206). The program calculates correct *daily* internal rates of return. However, it violates established conventions dealing with monthly and annual instruments.

For example, the loan analysis on page 190 deals with a loan of \$6000 repaid by 35 monthly installments of \$213.92 and a final payment of \$213.76. The federal Truth in Lending Act governs the disclosures of (true) Annual Percentage Rates (APR), and requires this loan to be analyzed by calculation of a monthly rate which is multiplied by 12 to obtain a quoted annual figure. The effective rate used by the financial community and required by law for disclosure on this loan is 17%. Unfortunately, the program states a "true" effective yield of 18.434%.

The final answer is unacceptable and conceptually incorrect, because the calculation assumes that the true rate is a daily rate which is compounded daily for a year to obtain a true annual

rate. Mortgage interest is not earned daily, nor is it compounded for the lender in that manner.

Without modification, this program will give answers that overstate the annual rate on monthly instruments such as mortgages, and will give answers which are inconsistent with the disclosure requirements of the Truth in Lending Act. (See, for example: Board of Governors of the Federal Reserve System, Section 226.40 of Regulation Z (Supplement I) Truth in Lending, as Revised January 10, 1982.)

Matthew J. Hassett, Ph.D.  
A.S.U. Mathematics Department

Lynn Kurtz, Ph.D.  
A.S.U. Mathematics Department

Daniel J. Hunter  
Mortgage Broker

## Cipher Fix

Dear Editor:

My article on "The Secret Code Machine" in the May issue of *Creative Computing* has attracted some comment but, more important, some suggested modifications, extensions, and corrections.

At least one typographical error crept into the listing accompanying the article (my fault!): Line 5030 should read GOTO 5030 (not the non-existent 5010). Furthermore, the entire routine from 16000 through 16150 is redundant and should be deleted.

More important, Martin's cub master, Peter Charlton, points out that the encypherment/decypherment routines do not handle j correctly. The fix is to add:

```
14214 IF LEFT$(MES(M),1)="J" THEN MES(M)="I"  
+ RIGHT$(MES(M),1)
```

```
14215 IF RIGHT$(MES(M),1)="J" THEN MES(M)=LEFT$(  
MES(M), 1)+"I"
```

Incidentally, Mr. Charlton has modified the program to run on an Apple II+ (without the printer routines) and would be pleased to supply a disk version for the usual \$5 sent to 305 Summit Ave., Ottawa, Ontario.

Finally, a number of Commodore 64 users have requested the program. The only changes required to the 40-character version relate to the C64 use of the old Basic 2.0 in its handling of disk routines. Whether you are typing in your listing or have bought a disk or tape from me, simply make this change:

```
2420 IF RRS="D" THEN LOAD"PLAYFAIR.40",8  
Otherwise, all systems are GO.
```

Gordon Ritchie  
2286 Bowman Rd.  
Ottawa, Ontario  
Canada

# TRUNKS FOR THE MEMORIES.



Introducing the most logical place to store Elephant Memory Systems® (or lesser brands of disks): The Trunk.

With its alphabetized library index, you can file or retrieve up to 60 disks, instantly.

The Trunk is made of durable molded plastic with a hinged, one-piece lid, to keep disks safe from dust, dirt, and other detriments which disks despise.

And, it's portable. Because the lid doubles as a carrying handle so your Elephant Memory Systems® disks can go anywhere you do.

There's a model for 5 1/4" and 8" floppies, as well as a cassette-and-game file and a special Atari® version.

So if you're looking for the best disk storage system on the market...

The Trunk is an open-and-shut case.

## THE TRUNK. ENDORSED BY ELEPHANTS.

### Elephant Memory Systems® Disks

*A full line of top-quality floppies, in virtually every 5 1/4" and 8" model, for compatibility with virtually every computer on the market. Guaranteed to meet or exceed every industry standard, certified 100% error-free and problem-free, and to maintain its quality for at least 12 million passes (or over a life-time of heavy-duty use).*

Marketed exclusively by Leading Edge Products, Information Systems and Supplies Division, 55 Providence Highway, Norwood, MA 02062. Dealers: Call toll-free 1-800-343-8413; or in Massachusetts, call collect (617) 769-8150.

CIRCLE 188 ON READER SERVICE CARD

# Creative Computing Street Price Index

This is the first month of publishing the Creative Computing Street Price Index. It is intended to be an on-going monitor of the average price levels of selected computers, peripherals, video games and related accessories in the real-world marketplace. The list price is the price set by the manufacturer for the product when it was first announced, and is not necessarily the current manufacturer list price.

As time goes on, this Index will be presented in graphical form, but until there are six or seven data points, a graph would be of little value.

This Index is not intended to be a purchasing guide. Frequently, the lowest price for a computer will be offered by a vendor who is going out of business or closing out that particular item. Unless you are convinced you will never need service or are skillful enough to repair an unhealthy computer yourself, you would probably not want to buy a machine from such an outlet.

Furthermore, most of our price monitoring is done in major metropolitan areas on the two coasts. Prices outside of large cities and in the central part of the country are usually higher.

<u>Computer</u>	Orig List Price	June 1983 .....Monthly.....			Month Ago	Year Ago
		High	Low	Average		
Apple IIe (64K, 40-col)	1395	1395	1175	1285	...	n/a
Atari 400, 16K	559	259	79(1)	178	179	352
Atari 800, 48K	999	549	369(1)	460	485	863
Atari 1200, 64K	899	679	424(1)	610	650	n/a
Commodore Vic-20	297	149	84	116	125	274
Commodore 64	599	399	289(1)	344	389	n/a
Osborne 1, 64K	1795	1795	1187	1492	1685	1895
Radio Shack: Color Comp, 16K	399	299	199	249	299	399
Model 4, 64K	999	999	999	999	n/a	n/a
TI 99/4A, 16K	635	269	98(1)	174	189	299
Timex 1000, 2K	99	65	34	46	55	149
Average home com- puter (up to 16K)	398	208	99	154	169	295

## Line Printer

Epson FX-80	699	695	565	630	n/a	n/a
Epson MX-80FT	745	505	429	467	467	567
NEC PC-8023A	795	499	435	467	467	599
Okidata 82A	799	459	380	420	439	549
Okidata 92	699	599	489	544	549	n/a
Star Gemini 10	449	399	339	369	375	n/a
Average 80-col dot matrix printer	697	526	439	482	459	572

## Video Games

Atari 2600	199	99	69(1)	84	99	149
Atari 5200	269	200	155	178	185	n/a
Colecovision	199	189	135	162	165	n/a
Intellivision II	199	150	79(1)	115	130	189
Average video game	216	145	109	127	145	169

## Dynamic Memory Chips (200 ns, quantity 8)

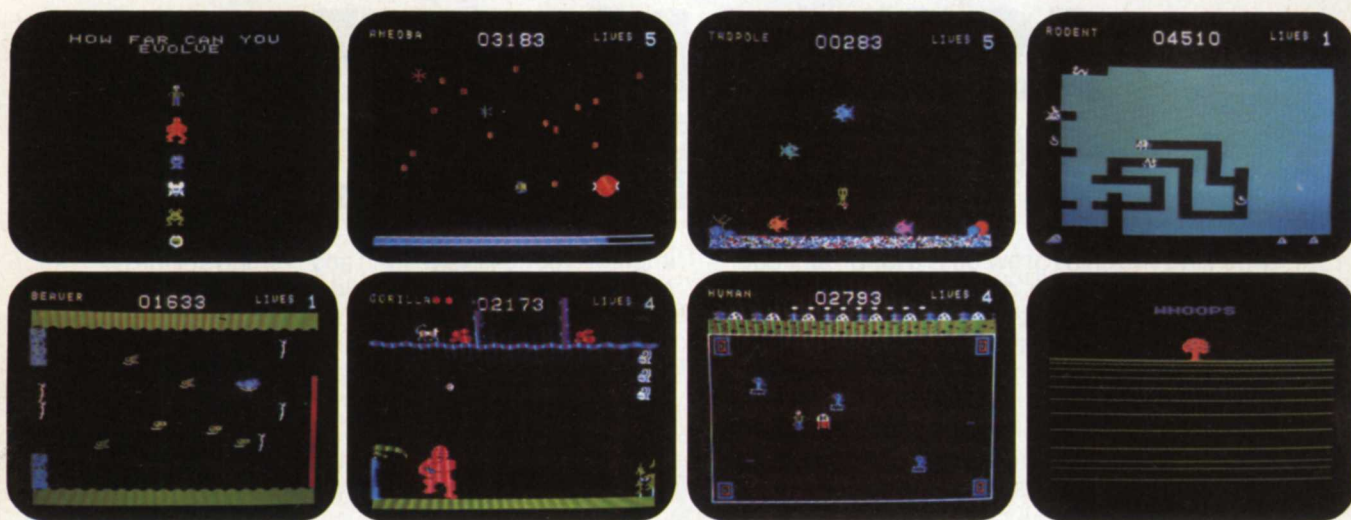
16K x 1 bit (4116) ...	1.95	1.50	1.73	...Lowest..	1.50	1.56
64K x 1 bit (4164) ...	7.49	5.95	6.72	...	...	n/a

(1) Includes a manufacturer rebate or equivalent

THE INCREDIBLE  
NEW PROGRESSIVE GAME FROM  
SYDNEY.

# EVOLUTION

ONLY THE STRONG SURVIVE.



## 6 games in 1

You start as an amoeba trying to advance up the evolutionary chain to become a human. To attain this goal you will have to go through 6 distinctively evolutionary steps:

- You're an amoeba fighting microbes while trying to eat DNA.
- You're a tadpole eluding fish to catch waterflies.
- You're a rodent chased by snakes while looking for cheese.
- You're a beaver attacked by alligators while building a dam.
- You're a gorilla protecting his food from monkeys.
- You're a man battling genetic mutants in an elastic background!

Hailed by leading reviewers as one of the most exciting games available.

**EVOLUTION is truly different. Try it today!**

*Created by Don Mattrick and Jeff Sember.*

©Sydney Development Corporation

Available at your local dealer or directly from Sydney.

Do you have the instincts and reflexes to survive and evolve to each higher life form? It's a challenge that grips you as no other game!

- Up to 99 levels
- Either a keyboard or joystick control
- Written in machine language
- Colorful high-resolution graphics
- Keeps track of top 10 scores
- Full convenience controls
- Arcade sound
- Even an intermission!

Play Evolution on Apple II, Apple II Plus, Commodore 64, IBM PC or Coleco Cartridge.



## Sydney

Dataproducts, Inc.

129-444 Camino Del Rio South  
San Diego, California, U.S.A. 92108  
(619) 298-5886

**In Canada:**

600-1385 West Eighth Avenue  
Vancouver, B.C., Canada V6H 3V9  
(604) 734-8822 Telex 04-54357

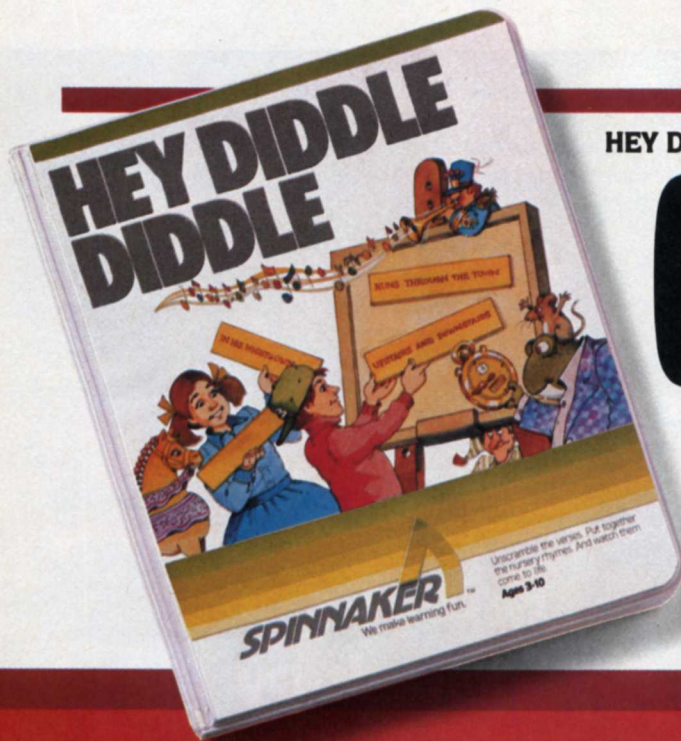
# SPINNAKER'S LINE OF EARLY LEARNING GAMES IS GROWING AS FAST AS YOUR CHILD'S MIND.

Watching your kids grow up is a lot of fun. But making sure their minds grow as fast as their bodies is even more rewarding. That's where we can help. With a growing line of Early Learning Programs that are not only lots of fun to play, but also educational.

Some of the games you see on these two pages help exercise your child's creativity. Others help improve vocabulary and spelling skills. While others

improve your child's writing and reading abilities. And all of them help your child understand how to use the computer.

So if you're looking for computer programs that do more than just "babysit" for your kids, read on. You'll find that our Early Learning Programs are not only compatible with Apple®, Atari®, IBM® and Commodore 64™ computers, but also with kids who like to have fun.

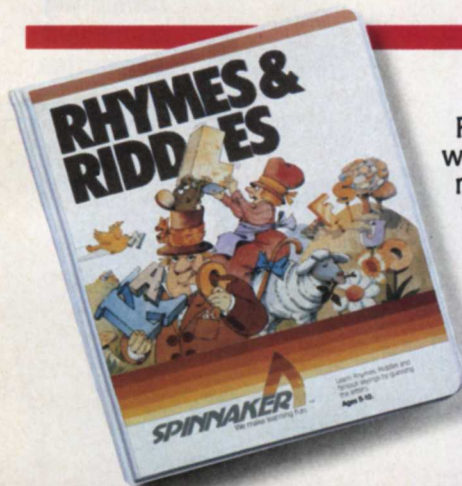


## HEY DIDDLE DIDDLE™ Poetry in motion. Ages 3 to 10.



Kids love rhymes. And since HEY DIDDLE DIDDLE features 30 classic rhymes with full color graphics and the neatest computer music you've ever heard, it makes rhyme games more fun than ever before.

Plus, it makes it fun for kids to read, helps them understand how words and rhymes create poetry and lets them take fragmented thoughts and rearrange them to form coherent verse.



### RHYMES & RIDDLES™ come to life. Ages 5 to 9.

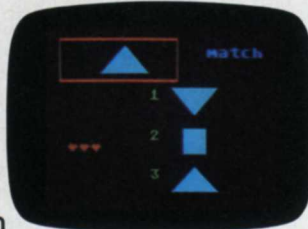
RHYMES & RIDDLES will delight your children. Because when they successfully complete the rhymes, riddles, and famous sayings on the screen, they'll see them come to life—with music



and colorful pictures. And RHYMES & RIDDLES not only teaches children the correct lyrics to nursery rhymes and famous sayings. It also helps kids learn to read and spell while they're having fun! That's why parents like RHYMES & RIDDLES, too!

### KINDERCOMP™ Numbers, shapes, letters, words and drawings make fun. Ages 3 to 8.

KINDERCOMP is a game that allows very young children to start learning on the computer. It's a collection of learning exercises that ask your children to match shapes and letters, write their names, draw pictures, or fill in missing numbers. And KINDERCOMP will delight kids with color-



ful rewards, as the screen comes to life when correct answers are given.

As a parent, you can enjoy the fact that your children are having fun while improving their reading readiness and counting skills.



### FACEMAKER™ makes faces fun. Ages 4 to 12.

FACEMAKER lets children create their own funny faces on the screen. Once a face is completed, your children will giggle with delight as they make it do all kinds of neat things: wink, smile, wiggle its ears, or whatever their imagination desires.



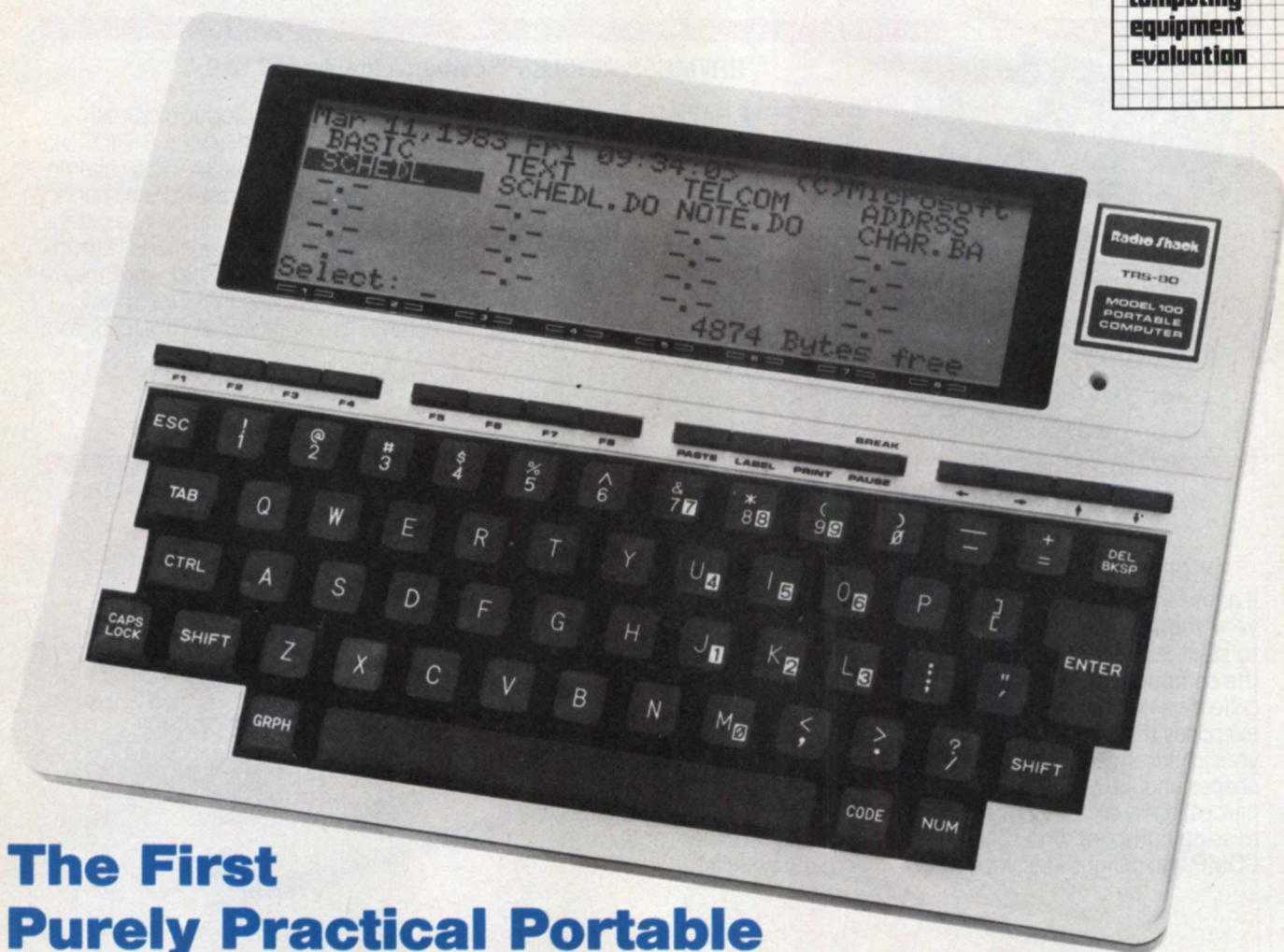
Plus, FACEMAKER helps children become comfortable with computer fundamentals such as: menus, cursors, the return key, the space bar, simple programs, and graphics. FACEMAKER won't make parents frown because their children will have fun making friends with the computer.



**SPINNAKER**™  
We make learning fun.

CIRCLE 206 ON READER SERVICE CARD

© 1983, Spinnaker Software Corp. All rights reserved.



## The First Purely Practical Portable

After what could politely be called a lengthy hiatus in its tenure at the epicenter of the microcomputer universe, the old champ is back and looking fit as ever. When I first got my paws on it, I felt a twinge of excitement the likes of which I haven't felt since I bought my first machine. It felt good. Like Ali in Manila, Billy Martin, Motown, and the miniskirt, the TRS-80 is back.

The temptation is to say "back in a big way," and that is true, though in this incarnation the TRS-80 in question is the size of a three-ring looseleaf binder. As I reclined on the living room couch listening to records and using the Model 100 to begin this review, it dawned on me that I would never again want to be without such a machine. For the likes of me, the implications for dramatically bolstered productivity are mind-boggling. Word processing in bed, folks—imagine the possibilities.

But is it really a breakthrough? There has been quite a bit of brouhaha of late

### John J. Anderson

concerning the TRS-80 Model 100 computer, and you perhaps remain wary. Judging from the hype concerning the product, passed off as journalism by some other periodicals, you are hardly to be blamed. As I had a rather unique perspective on the introduction of the unit, I think it is fair to say that my hearty enthusiasm is tempered by a healthy objectivity. And yet the coming impact of the machine (safely assuming

**The story of the Model 100 is not really the story of a TRS-80 at all.**

that prices will quickly fall) should not be underestimated.

The story of this TRS-80 is not like the story of any TRS-80 that has come before. And just as the introduction of the Model I was a pivotal industry story of the '70s, it is highly likely that the introduction of the Model 100 will be a pivotal industry story for the '80s. But why?

This is a riddle currently being posed by at least half a dozen other manufacturers even as you read this piece. A good answer requires a bit of background, just as it requires a good bit of respect for the designers of the machine.

### The Origin Of The Species

First off, we must acknowledge that "TRS-80" is a trademark that Radio Shack liberally sprinkles like fairy dust on every computer it produces. The moniker is no longer used to label the microprocessor residing within a certain machine, but to add reputation, visibil-



# How to chart your company's fortune without spending one

It's a fact. A single chart or graph can tell you instantly what it takes hours to interpret from printouts or other raw data.

Now, with Strobe Graphics Plotters and Software, you can create superb hardcopy graphics directly from your computer. And you can do it for a fraction of the cost of most other systems.

The Strobe System transforms complex data into dynamic, colorful visuals with a few simple commands from your computer. Charts and transparencies that once took hours to produce are plotted within minutes. Information can be presented as bar charts, pie charts, curves or isometrics using a variety of colors, character styles and symbols. And with a resolution of 500 points per inch, the Strobe plotters match or surpass the quality of plotters costing thousands of dollars more.



You can also save and modify your graphics through Strobe's menu-driven programs. A broad selection of software—including programs that plot directly from VisiCalc\* and Supercalc\*\* files—is now available.

When the Strobe Graphics System is interfaced to your computer, an 8½x11 inch sheet of paper can speak anyone's language—visually. Visit your local dealer and learn how to start

charting your fortunes today. Because a perspective on the present can also be your window on the future.



**Strobe Inc.**  
897-5A Independence Avenue  
Mountain View, CA 94043  
Telephone 415/969-5130

## The Strobe Graphics System

**Seeing is believing**

CIRCLE 262 ON READER SERVICE CARD

\*VisiCalc is a trademark of VisiCorp.

\*\*Supercalc is a trademark of Sorcim Corp.

## Model 100, continued...

ity, and a brand-name to otherwise unknown and untried products. I imagine we will have to wait at least another decade or so before Tandy works up the courage to give one of its computers another name.

So the story of the Model 100 is not really the story of a TRS-80 at all. That, too, is a revelation largely neglected by other publications: that this TRS-80 is an import. Another magazine (which shall remain nameless) went so far as to ask Tandy about the philosophy under-

lying the choice of the 80C85 CPU for the unit. A PR spokesman rushed to answer with sophistic relish, as if Radio Shack had been actively involved in the choice.

The fact is that the 80C85 was chosen by Kyoto Ceramics (Kyocera), the Japanese designers and builders of the original machine. They sold it to NEC for distribution in Japan, and NEC in turn licensed it to Tandy for distribution here and worldwide (though NEC is in no way enjoined from introducing its own

machine). The philosophy emanating from Fort Worth was not very much more than "let's go with that one."

Not to imply the pejorative in any way. On the contrary, the Model 100 is to my mind the best move we have seen from Radio Shack in at least three years. It is one bound to make its stockholders, who have recently been a bit edgy, as well as Model 100 owners, very happy. The TRS-80 name has leapt right back into the middle of the action.

But the record should for the sake of accuracy be set straight on the point of origin of the Model 100.

About a month ago I was visited by a very nice fellow by the name of Tom Priestly from NEC Electronics USA. He showed me a very interesting new portable computer from Japan: the NEC PC-8201. I was very impressed with it. It looked like a portable that really had the potential to go places.

"Finally," I said to him, "a lap machine with a full-stroke keyboard, substantial memory, and a generous LCD (liquid-crystal diode) screen display." And with built-in Basic, word processing, and database software, it wouldn't have to fight the uphill software battle that has often mired Japanese hardware in the American market. My fervent advice to Tom: load them up for shipment to the states as soon as possible.

He said that while no firm plans had been made to bring the machine to this country, NEC was testing the waters, sending up a trial balloon, running it up the flagpole to see if anyone salutes, so to speak. I saluted. With glazed eyes, I murmured that they would be utterly nuts not to start piling units into the next available boat, if not sooner. He only smiled. Little did I know.

Imagine my surprise, when two days later, the chief (DHA, the boss man, the big cheese) stopped in to tell me Radio Shack had announced its Model 100. I then realized just how far the NEC 8201 had already managed to go. It had made the metamorphosis into the Radio Shack TRS-80 Model 100 in the blink of an eye.

But let's give some credit to Tandy, for surely the whole plot was hatched a while back. There are some substantial differences, you see, between the machine that Tom showed me and the Model 100 that appeared at the lab. And while the 100 has features missing from the Japanese "notebook" machine, not all changes resolve in favor of the Radio Shack machine (see the sidebar).

One of the manufacturers that must be slapping its forehead hard right about now is Epson, the Japanese maker of one of the most popular microcomputer printers in the world, the MX-80. Many

## "POWER FAILURE"

Goodbye valuable data. Unless you have a Guardian Angel uninterruptible power source on duty.

Guardian Angel switches to 150 watts of backup power in 1/100 of a second or less while alerting you of blackout or brownout conditions. Its rugged 12V battery gives you up to six minutes (15 at half-rated power), enough to save your data and shut down your system if line power does not return.

Guardian Angel is compatible with virtually every major microcomputer system, including Apple, IBM, H-P, TRS-80, Xerox, Eagle and Osborne. Its transient voltage suppressor also prevents system damage from power spikes.

Guardian Angel simply plugs in between your power source and your microcomputer. Its compact size permits either desktop use or out of the way placement.

Protect your investment: see your R.H. Electronics dealer today about Guardian Angel or contact us at 566 Irelan Street, Buellton, CA 93427, (805) 688-2047.



Guardian Angel™, with LED power status indicator, automatically safeguards data from blackouts, brownouts for just \$595.

**RHELECTRONICS, INC.**

\*Patents pending. UL listed. FCC approved. 240V/50 Hz version available. Dealers and OEM inquiries invited.

★  
Thank  
Heaven  
We got a  
Guardian  
Angel.™

American industry analysts looked to Epson to make the first substantial Japanese microcomputer inroads in the US, with machines like the HX-20 and QX-10. Epson itself feverishly hoped to heat up the portable market with the introduction of the HX-20, and proceeded to back up that hope with an aggressive media blitz unrivaled by any Japanese competitor.

There on NBC, the back page of the *New York Times*, and the centerfold of *Newsweek*, was superior person A, with his trim, marvellously miniaturized HX-20, smirking as he watched silly person B, pitifully dropping component by component of his Apple system onto the college classroom floor—a brilliant campaign, largely responsible for introducing people to the very notion of the portable.

And yet somehow the market never materialized. The reasons are twofold, and not too difficult to fathom, except perhaps for Epson. First, the liquid crystal display of the machine was limited to four rows of 20 columns. Even as people marvelled at the size of the product, you could detect a look of claustrophobia in their eyes. At that size, a single business

**Japanese machines  
tend to curl up and  
die on our shores for  
the simple lack of  
software to run.**

address label could just about fit on the screen, if you were lucky.

The second reason is potentially endemic to Japanese machines. They tend to curl up and die on our shores for the simple lack of software to run. The HX-20 became just another pretty machine to bring home and look at, and hope for the future. As for me, well, give me an Apple with a roomy carrying case.

The HX-20 had nevertheless given life to some very innovative ideas. It showed that a portable could sport a life-size, full-stroke keyboard, on which touch-typing could take place, without sacrificing very much in the way of size. It dared to link a full-fledged 32K computer with an LCD display. And it created a new species of micro: smaller than the Osbornesque sewing machine case with a CRT, yet bigger than a handheld, of the kind usually giving rise to user thoughts of wrists the size of hamhocks or of sharpening fingertips in pencil sharpeners (for a further expose on the so-called "Chiclet Syndrome," see my

review of the Tymshare Scanset in the December 1982 *Creative*).

Showing their true professionalism, a plethora of other companies have lately rushed into the fray with their own HX-20 clones, true to the original in both crucial aspects, namely an inadequate display and no practical software. These concerns include respected American names like Texas Instruments, which chose with its CC-40 to narrow the display to a single line and reduce the keyboard to standard handheld "chiclet"

style. And despite the gelatinous protests of Bill Cosby, the stark commonality of these machines is that they are all going to be DOA—for those who don't watch *Quincy*, that means "dead-on-arrival." This goes even for some machines as yet unreleased (one might coin the acronym "DBA," or lamentably "dead-before-arrival"). But the Model 100 has changed all that.

#### Truly Portable

At 12" × 8½" × 2" and 3½ lbs, the



**NO POWER SPIKES  
WITH SUPER FAN II.**

Super Fan II's Zener Ray™ Transient Voltage Suppressor and Power Filter squelches spikes up to 6000 amps — even those caused by lightning — while responding up to 100 times faster than Apple II's

built-in suppressor.

In addition, Super Fan II cools your Apple, removing heat buildup at a remarkable 17 cubic feet of air per minute. Yet it's the quietest fan of its kind on the market.

Super Fan II also positions a lighted on/off computer switch and two accessory plugs at your fingertips. It's warranted for two years and simply clips to your Apple II, IIe or monitor stand.

See your R.H. Electronics dealer today about Super Fan II\*, or contact us at 566 Irelan Street, Buellton, CA 93427, (805) 688-2047.

**RHELECTRONICS, INC.**



Super Fan II, in black or tan: \$109.  
Without Zener Ray: \$74.95.  
Additional air flow seals, \$5.  
Available in 240V/50 Hz.

Dealer/OEM inquiries invited.  
\*U.S. Patent #D268283  
#4383286

France, call B.L.P. 1-255-4463  
Australia, call Imagineering (02)212-1411

CIRCLE 237 ON READER SERVICE CARD

## Model 100, continued...

Model 100 is about as portable as you can get. The first thing you notice about it is the size of its liquid crystal display. It is eight lines of a full 40 columns, using nicely-sized and highly legible characters in a window of  $7\frac{1}{2}'' \times 2''$ . If you use dot-addressable graphics, you may access a matrix of  $240 \times 64$  pixels. That is quite enough to accommodate most of a paragraph. I'm sure that as manufacturers become less bashful concerning large LCD displays, we shall see them at twice and even three times that size, but for starters, it is positively huge. It is certainly adequate for on-the-go text editing, which is an application in which I am intensely interested.

Let me put in a good word for lines as opposed to columns. I would much rather have eight lines of 40 characters, as the 100 provides, than one, two, or three lines of 80 characters. It is simply easier to read text in that format. Remember, the width of a typical newspaper column is 35 characters. The direction of growth that I would most like to encourage is in the number of lines a machine offers. How about 16, 24, or 32? Where to fit this sizable screen, you ask? Why in the hinging lid, of course.

### The Keyboard

Probably the next thing you'll notice about the TRS-80 Model 100 is its nononsense full-stroke keyboard, utterly free of keybounce and unorthodox key placement. It is ready for quick and

---

***The cursor movement keys are arranged in linear format, which is a bit troublesome.***

---

painless touch typing. A closer look reveals eight programmable function keys with corresponding label functions displayed at the bottom of the LCD window. Dedicated function keys are devoted to functions called print, label, paste, and pause. Print does just that—to any parallel printer if you have a connecting cable. Label selects and deselects the naming of function key functions at the bottom of the LCD window. Paste is the block insert function used by the text editor. And pause is an extremely handy key which allows program execution to be frozen without a BREAK. Press it again to resume from exactly where you left off.

In addition to these and the IBM Selectric-style keyboard, there are keys

labelled NUM, GRPH, and CAPS LOCK. NUM is a detent key that transforms the keys U, I, O, J, K, L, and M into a numeric keypad along with the standard QWERTY 7, 8, and 9, quite like that on any adding machine, though on somewhat of a slant (see photo). Using GRPH, all 256 characters the Model 100 is capable of producing can be accessed from the keyboard, which is a unique capability.

The cursor movement keys are arranged in linear format, which is a bit troublesome (one of the places where the Japanese model wins out). But, with a bit of practice, you can get used to working with them.

Now that we have taken a quick look at the business end of the Model 100, let's snoop around the sides and back of the machine.

### Modem And Bar Code Reader

Starting clockwise on the lefthand side, we first encounter the originate/answer toggle switch. This is used to select the operation parameters of the built-in modem. Just left of that is another switch that tells the computer whether it is using an acoustic coupler or direct-connect to the phone lines (more about telecommunications potential up ahead).

Next to the toggles and hidden under a little plastic hatch is the male DB-9 connector for a bar-code reader. Yep folks, you read me right. The Model 100 will read bar code, if you supply the wand (Hewlett-Packard HEDS-3000 compatible) and the software. I am quite convinced that bar code will find a place in the microcomputer community, though it will be a while. It is the only print medium with anything approaching a respectable baud rate for data transfer.

Wondering what the big deal is about those zebra stripes you see even on the cover of magazines like this one? Well imagine waving the bar code reader of your micro over a page of the magazine, and entering a complex, error-free program in seconds, as opposed to spending tedious hours copying and debugging listings by hand, only to give up in despair. I figure my own rate at that occupation to be about 10 or 12 baud, with errors. Yeow. I hold out the hope that someday *Creative Computing* will carry bar coded program listings, and I see the bar code reader port on the side of the Model 100 as a step in the right direction.

Continuing around to the rear, we see twin DIN sockets for connection to cassette recorder and modem cables. They use different pin configurations, so it is impossible to plug a cable into the wrong socket. I also foresee another use for the

cassette socket, which I will describe below.

### Printer Interface

Left of these is the parallel printer interface. Using an inexpensive custom cable from Radio Shack, the Model 100 will drive any Centronics compatible printer directly.

As far as I am concerned, this is a much more logical approach to obtaining hard copy from a portable than a built-in impact printer, which uses loads of juice, draining precious battery charge, and adds weight and bulk. What's more, for most users, a print-out the size of a cash register tape is of limited use. Chances are that the Model 100 will be a second computer and that most users will have access to at least one printer. Certainly in the near future, printers will be available at almost any business destination, and a lifesize print-

---

***It makes more sense to keep the printer outboard.***

---

out can then be output in seconds. It makes more sense to keep the printer outboard.

Moving left of the printer interface we find the RS-232C serial interface. This jack makes hooking the Model 100 to another computer a relatively simple task. A standard issue female DB-25 is offered, meaning that you may already have the necessary cable on your existing desktop micro. Match up your configurations, and you're rolling.

### Reset

At the extreme left of the back side is the reset button, recessed under the plastic cowl of the machine to avoid accidental engagement. A push of the button will invoke a warm start, which will nearly always get you out of whatever trouble has prompted you to push it in the first place. In the rare instance that you are still locked up after a warm reset, you will have to initiate a cold start by holding reset while powering down, then up. Or you can press CONTROL-PAUSE while holding the reset button. And zap: this action will induce instant amnesia in your machine. It will forget all it ever knew.

We have now rounded to the right side of the Model 100, where the on-off switch, AC adapter socket, and LCD adjust dial are located. Not much to say here, except that the LCD adjust dial allows the user to adjust the angle of

# HOT STUFF



You'll find it wherever computergamers go to score the latest and greatest in entertainment software.

The HOT RACK. It's where the "hot" ones are.

You'll find games that'll grab you, thrill you, and hurl you to worlds you never dreamed were possible. Best-

sellers like CHOPLIFTER. CASTLE WOLFENSTEIN. AZTEC. STAR-BLAZER... and many, many more.

So, stop wasting your time and money on games that could leave you cold. Look for the HOT RACK at your local computer store.

If you don't see it, ask for it.

Dealer inquiries invited.

Dealers only, call 800 432-3129 (Inside California) or 800 854-6801 (Outside California).

Another marketing first from MICRO D.

CIRCLE 211 ON READER SERVICE CARD

## Model 100, continued...

reflection of the liquid crystal display for good visibility from whatever position he is in. Critics of LCDs take note: really the only problem with them is that they are like Fresnel traffic light lenses—highly directional. This adjustability feature alleviates the problem completely.

### Bottom's Up

Now let's look at the flip side. The prominent feature here is the battery compartment, holding four AA alkaline penlight batteries. They will last about 20 hours per set. Also on the belly of the beast is a toggle switch to the

rechargeable nickel-cadmium batteries that keep the CMOS RAM intact. If the unit will not be used over a long period of time (highly doubtful), the documentation advises flipping off the switch to preserve the ni-cads. This will, of course, flush all contents just like a cold start.

Even with heavy use, the batteries should recharge themselves from AC satisfactorily over a period of two or three years. To preserve memory contents, you may save all the data to storage media or another computer before storage or a battery change. Then you

can reload the data at a later date.

The final, and most mysterious, aspect of the underside is the black hatch cover that calls for a coin to pry it open. Inside lies a ROM socket and a 40-pin expansion bus. All Radio Shack has said is that it plans 32K ROM application programs for the ROM slot. As for the expansion bus, mum's the word. Clearly that would be the place, we may conjecture, to connect a disk drive or patch the machine to a bona fide CRT screen.

Unseen but inside is the complementary metal oxide semiconductor RAM, available in sizes ranging from 8 to 32K. Then there is the CMOS ROM, of which there is 32K on a *single chip*. This was quite a feat. They both address the 80C85 microprocessor, which is architecturally very much like your run-of-the-mill 8085, CMOS-style.

### Power Up

Let's switch the thing on. We are immediately greeted by the ROM-based menu program (see photo). Across the top line we read the date, day, and time in 24 hour format. Next comes a list of all the programs and files available in the machine. The cursor movement keys and spacebar allow the user to flip through the files until the desired one is



Menu runs upon power-up.

highlighted. The program or file can then be selected by pressing ENTER. Or, if you choose to do so, you can enter your file of choice by name.

In addition to whatever files you construct, five ROM-based programs will always be available to you: Basic, Text, Telcom, Addrss, and Schedl. As these programs reside simultaneously in ROM, as do data files in RAM, the Model 100 reaches a surprisingly high level of integration.

"Integration" is in microcomputing a term usually invoked when talking of high-end machines. For example, software for the Apple Lisa is highly integrated. It simply means that one piece of software can use information directly from another piece or move directly to a new function, as if you were using more than one computer.

We shall take a closer look at each of the software components built in to the Model 100, in what should *not* be construed as order of importance.

## Games on the Model 100: LCD-Fender

Forty columns by eight rows is more than ample room for somewhat advanced graphics applications. The program LCD-Fender, for example, is an Invaders-type game that captures much of the excitement of a CRT-based game, only in miniaturized form. If you take the time to type in the listing and study the game, you will learn quite a lot about graphics on the Model 100. The game is also a heck of a lot of fun to play.



Every machine deserves its own space shoot 'em up.

A cassette-based Invaders game included with the NEC 8201 uses the left and right cursor keys for movement. I used it as the starting point for this game but soon discovered that the left and right cursor keys on the 100 were not nearly fast enough for "twitch" style gaming, and so moved directional input to the < and > keys.

Blast aliens out of the sky using the spacebar. Be accurate: every miss costs points and brings the alien a level closer. A direct hit gains you 100 points. "Winging" is worth 50. When only 50 time units are left, the game will warn you. Your player has full screen wrap-around.

Needless to say, although the game has a few sophisticated features, this is just a beginning, a starting point for graphics games on the Model 100. Next week, Pac-Man! —JJA

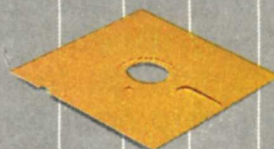
```
1 REM LCD-Fender by John Anderson
10 DEFINT A-Z
15 FOR X=1 TO 10: I$=INKEY$: NEXT
20 CLS: SC=0: PRINT " LCD-Fender"
30 PRINT: PRINT " Press (SPACEBAR) to play
:PRINT:PRINT " Press (I) for instructio
ns:"
35 PRINT:PRINT " Press (M) for menu."
40 I$=INKEY$: IF I$=" " THEN GOTO 60
50 IF I$="M" OR I$="m" THEN MENU
52 IF I$="I" OR I$="i" THEN S10
55 GOTO 40
60 M=20: SCREEN 0,0: CLS: T=350
70 R=0: X=RND(1)*35+1
80 T=T-1: PRINTEX+R, " ^ ^ ^ ";
90 I$=INKEY$
100 IF I$="," THEN M=M+1
110 IF I$="." THEN M=M-1
120 IF I$=" " THEN GOSUB 230
130 IF T<0 THEN GOTO 450
140 IF M<0 THEN M=39: PRINTEX+40, " ";
150 IF M=39 THEN M=0: PRINTEX+39+(6+40), "
";
160 PRINTEX+1+(6+40), " + ";
170 PRINTEX+(7+40), T: " hi-score:":HS:
180 PRINTEX+27+(7+40), "score:":SC:
190 P=RND(1)*4-1: S=RND(1)*2
192 IF S=1 THEN P=-P
194 X=X+P
200 IF X<1 THEN X=1
210 IF X>35 THEN X=35
215 IF T<50 THEN SOUND 4000,1
220 GOTO 80
230 REM
240 FOR Y=5 TO 0 STEP -1
250 PRINTEX+(Y+40), "I"
260 SOUND Y+1000,1
270 PRINTEX+(Y+40), " "
280 NEXT
290 IF M=X+2 OR M=X+4 THEN SC=SC+50: BEEP
:GOSUB 330: GOTO 70
300 IF M=X+3 THEN GOTO 390
305 PRINTEX+R, " " : R=R+40: SC=SC-S
307 IF R>200 THEN SC=SC-10: GOTO 70
310 RETURN
320 REM assorted subroutines
330 FOR I=0 TO 10
340 PRINTEX+1+R, "BLORK!"
350 FOR J=0 TO 20: NEXT: PRINTEX+1+R, "
"
360 SOUND 16000,1: NEXT
370 GOTO 70
380 REM
390 SC=SC+100: SOUND 440,10
400 FOR I=0 TO 10
410 PRINTEX+1+R, "WAAGH!"
420 SOUND 1760,1
430 NEXT I
440 PRINTEX+1+R, " "
450 GOTO 70
460 IF SC>HS THEN HS=SC
470 PRINTEX+175, "GAME OVER": LINE (0,0)-(23
9,63),1: BF
475 PRINTEX+125, " score:":SC: "hi-score:":H
S:
500 FOR X=1 TO 4000: NEXT: GOTO 15
510 CLS: PRINT " Use < to move left, > to
move right, :PRINT and the spacebar to
fire."
520 PRINT:PRINT " DIRECT HIT=100 WING=50
"
530 PRINT " Penalties for letting aliens
descend."
540 PRINT:PRINT " Good luck! Hit (SPACEBA
R) to begin!"
550 I$=INKEY$: IF I$=" " THEN GOTO 60
560 GOTO 550
```

***a.d. 2082.  
Diskettes  
duplicated  
by Allenbach  
in 1983  
will still be  
guaranteed.***

**T**his Lifetime Guarantee, exclusive to Allenbach, adds quality and consumer confidence to your software products. While this alone is reason enough to let Allenbach handle your software duplication, most software developers initially choose us for convenience. We can probably complete your production faster than you can. Additionally, your whole project can become one-easy-step by having us perform all packaging requirements from printing to assembly.



You'll also appreciate the high standard of excellence demanded by Allenbach. Software duplication for practically any format is our primary business. We've established a team of professional technicians who specialize in all phases of software duplication. Your software is effectively reproduced on specially designed precision duplicating equipment. Also used are exacting verification methods unique in the industry to guarantee 100% accuracy. Plus your software will be duplicated onto the Allenbach diskette, the OEM diskette that is Guaranteed for Life.



  
**ALLENBACH**  
INDUSTRIES INC.  
CIRCLE 108 ON READER SERVICE CARD

Allenbach *really* is the logical solution for your software duplicating needs. So feel free to call us with your questions. Take advantage of our years of experience and knowledge. Have Allenbach do what we do best, so you can do what you do best.

2101 Las Palmas  
Carlsbad, California 92008  
619-438-2258  
800-854-1515 (Toll Free)  
Telex: 19-4561 LSA

### Text

Radio Shack avoids using the term word processing to describe the text editor made available by the Text program. It does, in fact, lack many of the features available on bigger machines. But it really should be judged on what it *does* do rather than on what it does not do. What it does do is present an environment wherein words and programs can be processed quite efficiently—without muss or fuss, as I like to say—while leaving user RAM entirely to file storage.

While it does not offer a “search and replace” feature, and its limited “find” function terminates at the first occurrence of any designated string, Text does

### ***The Basic onboard the TRS-80 Model 100 is as powerful as that of its desktop counterparts.***

allow block move, copy, and delete functions. While its manner of storage creates a ragged left screen margin on lines with leading spaces, special movement commands nevertheless make scrolling through a document a breeze.

Inserting new text into existing text is slow, but a generous type-ahead buffer is provided. And while you cannot set the left margin on a direct printout anywhere but adjacent to the lefthand perforations, nor can you set pagebreaks, you *can* designate column width (up to 132 columns).

I have pumped about 90K or so of text into (and out of) the Model 100 by now, and have grown very accustomed to its mode of operation. While it is admittedly a “bare-bones” editor, it is very fair to say that those bones are resilient and smoothly-hinged. Editing text presents little problem, especially if like me, you will ultimately be uploading files elsewhere for final processing.

### Telcom

Next we have Telcom, the communications program that allows the Model 100 to communicate with the outside world. Without Telcom, word processing on the Model 100 would be of little use to me.

First I attach an RS-232C cable from the serial card in my Apple II to the RS-232 port on the 100. Then I run Telcom on the TRS-80, making sure to set the configuration to match the card and terminal program I have run on the Apple, and I'm in business.

I can download, upload, or type directly in either direction from one machine to the other. Of course my primary interest is uploading from the TRS-80: I store the uploads as Apple text files, which are then directly accessible from my Apple word processor. It is this capability that to my purposes makes the Model 100 a practical and desirable tool.

But the 300 baud inboard direct-connect modem in the Model 100 takes things a giant step further. By connecting a modular phone and line with a special cable to the Model 100, you can join the world of telecommunications: bulletin boards, networks, mainframes, and other micros. I “called” my Atari on the phone, and easily transferred files. Who would have thought the TRS-80 would have so effectively invaded my sheltered, 6502 processor-dominated world?

If you do not ordinarily have access to a modular telephone, you may purchase the acoustic coupler option that has cups that slip over the phone handset. This makes any hotel phone or telephone booth into a potential telecommunications tool.

And we've only begun. The built-in modem can also *dial* your phone for you, whether or not you are placing a telecommunications call. If you are, it can automatically transmit special passwords and log-on sequences. If you are not, just pick up the phone. And that is that.

I'll bet you are beginning to get the idea now.

### Addrss

Allow me to continue with Addrss. This is a mini-database program, which you can structure in any way you wish. Then, by instituting a string search, you can recall any file of any length, as long as it is separated by carriage returns from other files.

If you enclose the phone number in colons, it can be auto-dialed directly from the Telcom program. This is the kind of integrated capability I alluded to above when I went so far as to invoke the name of Lisa in our discussion. As mentioned above, log-on sequences can be stored here too, for direct transmission at the time of connection.

### Schedl

Schedl is a very similar program, though without telecommunications integration. It allows you to construct a second and wholly separate database, and the suggestion is to use it to keep an appointment calendar. Like Addrss, it is a string-based search program, and so can be used to organize any data you like.

Then there is Microsoft Basic.

### Basic

When Dave visited Microsoft in Japan last week, they told him that all 8-bit processor work now emanates from Japan, leaving the U.S. component of Microsoft free to concentrate on 16-bit machines. Well, the Japanese division has been hard at work.

The Basic onboard the TRS-80 Model 100 is as powerful as that of its desktop counterparts, PEEK for PEEK, POKE for POKE, and CALL for CALL. As far as I can tell, it should also be quite portable. The 80C85 is in the Z80 family, after all, and so a fair amount of compatibility with other TRS-80 Basics should come as no surprise.

But there are a few surprises in Model 100 Basic. First of all, any Basic file will autorun if selected from the main menu program. The command MENU will return to the menu program at the conclusion of a Basic program run, if desired.

Basic can also access data in other programs or data files, again in a highly integrated manner. You could write enhancements to the text editor in Basic, for example, and use it to overcome the inadequacies of the print function from Text (namely, setting a left margin and page breaks). You could write complex

## **Introducing the RAM Cartridge**

One of the more provocative features of the NEC notebook machine fits in the cartridge slot on the lefthand side of the unit. In addition to 32K ROM-based applications, a 32K CMOS RAM cartridge can be plugged into that slot.

Powered by its own mercury batteries, the RAM cartridge is utterly nonvolatile. That is to say, any or all internal RAM contents of the portable computer can be uploaded to a RAM cartridge and stored there for good lengths of time. This would in turn free RAM in the portable machine for further use.

With three or four RAM cartridges in your briefcase, you would have all the storage capacity of a fully-configured desktop computer, without the need for disk drives. Need another 32K? Just get a hold of another cartridge.

The CMOS RAM cartridge most definitely has a promising future in the portable microcomputer world. And although the Model 100 does not sport a cartridge slot, as does its cousin the NEC, the capability could most certainly be added to the machine through the expansion bus. We surely hope Tandy will exploit this possibility.



# TYPE ATTACK™



© 1983 Sirius

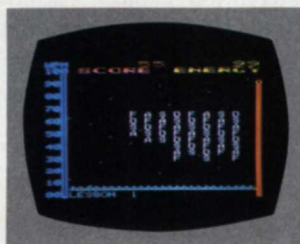


For more information contact your local Sirius dealer or contact Sirius directly at 10364 Rockingham Drive, Sacramento, CA 95827, (916) 366-1195.

Game design by Ernie Brock and Jim Hauser.

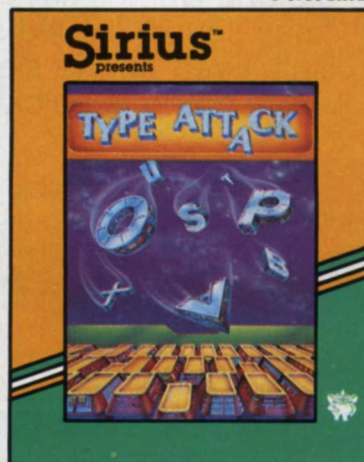
Package, program and audio visual © 1982 Sirius Software, Inc. All rights reserved.

Sirius and Type Attack are trademarks of Sirius Software, Inc. Apple II, II+ and IIe are trademarks of Apple Computer, Inc. Commodore 64 and VIC-20 are trademarks of Commodore Business Machines, Inc. Atari 800 and 1200 are trademarks of Atari, Inc. Sirius is not affiliated with Apple, IBM, Commodore or Atari.



Apple II, II+ & IIe Disk

Atari 800 & 1200 Disk  
VIC-20 Cartridge  
Commodore 64 Disk



CIRCLE 192 ON READER SERVICE CARD

# Look what we have in store for your Atari.

Arti  
Haroutunian  
has done it again.

The mind behind our first Atari® success, *Kid Grid*, has just dreamed up another one: *Juice!*

And if you don't think that's electrifying, consider what the experts are saying.

Electronic Fun with Computers and Games says that *Kid Grid* "may sound like kid stuff, but it isn't. Even on the slowest setting ...the game is quick enough

to challenge  
almost anyone."

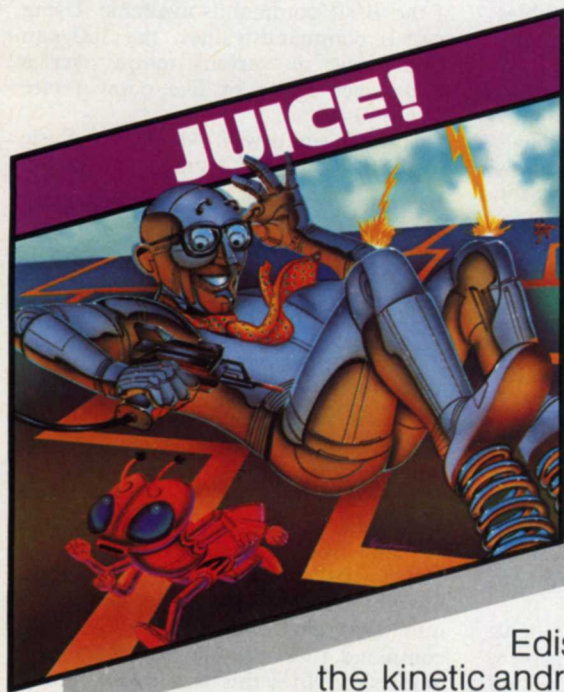
That's right. And that's not all.

Electronic Games calls the *Kid* "Hypnotic, appealing, fast-moving arcade action of the highest calibre, ...one of the most compulsive, utterly addictive contests in the world of computer gaming."

We couldn't agree more.

What will the critics say about *Juice!*? Will they like its colorful graphics, superior sound effects, charming characters and challenging play patterns?

Why wait around to find out?



Edison,  
the kinetic android,  
leads a frustrating life.

All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

Nohms—a negative influence—bug him constantly. Flash, the lightning dolt, disconnects everything in his path.

And the cunning Killerwatt is out to fry poor Edison's brains.

You'll get a charge out of this one. And a few jolts, too!

(Requires 32K memory. Suggested retail \$29.95)



Con-  
necting the dots  
on our colorful grid should  
be easy, right?

Wrong. Because the bullies  
are in hot pursuit!

Squashface, Thuggy, Muggy  
and Moose are their names. And  
you are their game. And what's  
more, they're faster than you are.

But you're smarter. And you  
control the stun button.

So keep your eyes peeled for  
the mysterious question mark  
and don't slow down at corners!

(Suggested retail: \$29.95)

# ATARI™

8295 South La Cienega Blvd., Inglewood, CA 90301

Available on diskette or cassette for your Atari 400, 800 or 1200 computer.

Atari® is a registered trademark of Atari, Inc.

CIRCLE 222 ON READER SERVICE CARD

## Model 100, continued...

telecommunications applications that interface with Telcom. Or you could search data files.

Using the command IPL, you can change the warm start autorun file from the ROM-based menu program to any

program of your choice. I have used it to create a rudimentary password-protection system on my machine. If the user does not enter the correct password after power on, the unit admonishes him, and then, with the simple Basic command POWER OFF, turns itself back off. (Until I find the POKE that disables the BREAK key, this won't be a totally effective failsafe.)

There is even a command called ERROR, which allows you to "simulate" an error condition. Why in heaven's name anyone would want to do this is quite beyond me at the moment, but the potential is nonetheless there.

The only command I found to be missing is a LOCATE or POSITION command to set the cursor at a specific point on the screen using x and y arguments. I was surprised at the omission, especially in light of the fact that the NEC machine *does* include the command LOCATE in its Basic repertoire. There is a command called POS in Model 100 Basic, but all it does is *return* the current cursor position. The only alternative is to use the PRINT @ command, along with the formula  $x + (Y*40)$  to convert screen position to a single argument format. This is a pain.

The graphic command LINE allows lines to be drawn on the screen. Modifications to the LINE command change input values from the end points of plotted lines to the diagonal corners of a rectangle or square. A further modification allows the boxes to be "filled in." These commands, along with

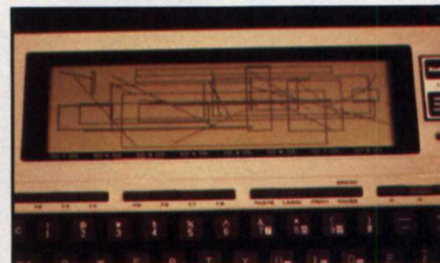
the 256 characters available, give the Model 100 surprisingly sophisticated graphics capabilities (see Figure 1). If *only* there were a LOCATE command...

And as if that were not enough, the TRS-80 can make sounds. And it can do more than just BEEP, though that is one of the Basic commands available. Using SOUND command values, the 100 can play music at various tempi over a single-voice range of five octaves (see Figure 2).

Another snafu with Model 100 Basic is editing. The NEC machine has full

Decimal	Hex	Binary	Printed Character	Keyboard Character
144	90	10010000	␣	GRAPH y
145	91	10010001	␣	GRAPH u
146	92	10010010	␣	GRAPH :
147	93	10010011	␣	GRAPH q
148	94	10010100	␣	GRAPH w
149	95	10010101	␣	GRAPH b
150	96	10010110	␣	GRAPH n
151	97	10010111	␣	GRAPH :
152	98	10011000	␣	GRAPH o
153	99	10011001	␣	GRAPH :
154	9A	10011010	␣	GRAPH i
155	9B	10011011	␣	GRAPH k
156	9C	10011100	␣	GRAPH 2
157	9D	10011101	␣	GRAPH 3
158	9E	10011110	␣	GRAPH 4
159	9F	10011111	␣	GRAPH 5
160	A0	10100000	␣	CODE :
161	A1	10100001	␣	CODE x
162	A2	10100010	␣	CODE c
163	A3	10100011	␣	GRAPH 8
164	A4	10100100	␣	CODE :
165	A5	10100101	␣	CODE M
166	A6	10100110	␣	CODE )
167	A7	10100111	␣	CODE :
168	A8	10101000	␣	CODE +
169	A9	10101001	␣	CODE s
170	AA	10101010	␣	CODE R
171	AB	10101011	␣	CODE C
172	AC	10101100	␣	CODE p
173	AD	10101101	␣	CODE :
174	AE	10101110	␣	CODE /
175	AF	10101111	␣	CODE 0
176	B0	10110000	␣	CODE 7
177	B1	10110001	␣	CODE A
178	B2	10110010	␣	CODE O
179	B3	10110011	␣	CODE U
180	B4	10110100	␣	GRAPH 6
181	B5	10110101	␣	CODE [
182	B6	10110110	␣	CODE a
183	B7	10110111	␣	CODE o
184	B8	10111000	␣	CODE u
185	B9	10111001	␣	CODE S
186	BA	10111010	␣	CODE T
187	BB	10111011	␣	CODE d
188	BC	10111100	␣	CODE :
189	BD	10111101	␣	CODE v
190	BE	10111110	␣	CODE =
191	BF	10111111	␣	CODE F
192	C0	11000000	␣	CODE l
193	C1	11000001	␣	CODE 3
128	80	10000000	␣	GRAPH p
129	81	10000001	␣	GRAPH m
130	82	10000010	␣	GRAPH f
131	83	10000011	␣	GRAPH x
132	84	10000100	␣	GRAPH c
133	85	10000101	␣	GRAPH a
134	86	10000110	␣	GRAPH h
135	87	10000111	␣	GRAPH t
136	88	10001000	␣	GRAPH i
137	89	10001001	␣	GRAPH r
138	8A	10001010	␣	GRAPH /
139	8B	10001011	␣	GRAPH s
140	8C	10001100	␣	GRAPH :
141	8D	10001101	␣	GRAPH =
142	8E	10001110	␣	GRAPH i
143	8F	10001111	␣	GRAPH e

Figure 1. Just some of the 256 special characters available from the Keyboard. Custom sets are also possible.



Graphics using line and box commands.

cursor movement and editing features available from the Basic execution mode. Not so with the Model 100. The Basic file you wish to modify must be brought into Text environment with the EDIT command to evoke editing capabilities. With short files this is a minor annoyance. A quick hit of function key 8 and you are again ready to run the file.

But with a long program, it can take upwards of two minutes for the 100 to

*Continued on page 32.*

### SOUND pitch, length

SOUND "plays" a given pitch for the given length. *length* ranges from 0 to 255. Dividing length by 50 gives the approximate length in seconds. *pitch* ranges from 0 to 16383, with the larger values corresponding to higher pitches. The values of *pitch* corresponding to musical notes are shown below.

Octave					
Note	1	2	3	4	5
G	12538	6269	3134	1567	783
G#	11836	5918	2959	1479	739
A	11172	5586	2793	1396	698
A#	10544	5272	2636	1318	659
B	9952	4976	2484	1244	622
C	9394	4697	2348	1174	587
C#	8866	4433	2216	1108	554
D	8368	4184	2092	1046	523
D#	7900	3728	1975	987	493
E	7456	3718	1864	932	466
F	7032	3516	1758	879	439
F#	6642	3321	1660	830	415

Figure 2. Five-octaves of single-voice sound.

# NOAH WEBSTER, MEET YOUR MATCH.



A few months ago, Jennifer would rather have gone to the dentist than do her spelling homework.

Then Mom bought Crypto Cube™ by DesignWare.™ Now Jennifer has become a word fiend. In fact, she spends hours paging through the dictionary to find words that will stump her parents. And, as she does, she builds her word skills.

Crypto Cube, like all DesignWare software products, combine computer game fun with sound educational principles.

## THE THREE DIMENSIONAL COMPUTER WORD PUZZLE.

Five minutes after Jennifer sat down at the computer with Crypto Cube, she was hooked. First she worked her way

through the many word puzzles that come with the game. Then her parents typed her spelling homework into new puzzles.

Then Jennifer started making puzzles for her parents!

So now, Crypto Cube is the favorite family game in Jennifer's home.

As Jennifer would say, "indubitably."

## DESIGNWARE MAKES LEARNING COME ALIVE.

If you own an Apple ][ plus, Apple //e IBM-PC, Atari 400, 800, or 1200XL with a disk drive, you should take a close look at all the DesignWare software.

Another word game, Spellicopter,™ is an action-packed spelling game. You'll fly perilous missions through

crowded skies and mountainous terrain to rescue words. And you'll want to keep an eye out for our new math and science games. See your local dealer or call DesignWare at (800) 572-7767, in California (415) 546-1866 for our free software catalog. You'll be delighted with the way your kids will learn with DesignWare.

And they'll be playing for the fun of it.



# DesignWare™

LEARNING COMES ALIVE.

\*Atari 400, 800, and 1200XL, IBM-PC and Apple ][ plus and Apple //e are trademarks of Atari, Inc., IBM Corp. and Apple Computer, Inc. and are not related to DesignWare.

CIRCLE 152 ON READER SERVICE CARD

## Radio Shack Model 100 vs. NEC PC-8201

**David H. Ahl**

I recently took a trip to the Far East. To keep notes from the trip, write memos and letters, and keep a record of expenses, I decided to take along a notebook computer. I had intended to take my Epson HX-20, although I was not thrilled at the prospect of having to use my kluged-up text editor which requires numbered lines of 255 or fewer characters. Epson has promised a text editing package, *Correspondence*, but I have yet to see a live one.

Then, two days before I was to leave, Radio Shack announced the Model 100. After a quick phone call to the product manager in Fort Worth to verify its capabilities, I dashed over to the

local Radio Shack Computer Center and bought an expanded 24K Model 100 for \$999.

The machine is wonderful and nearly everything that I hoped, hence when I saw the NEC look-alike in Japan, the PC-8201, I decided to get one to do a comparison report.

In most respects, the two machines are virtually identical. Yet industry insiders who have been exposed to both have sharply different preferences. Following are some of the reasons, and my judgement as to which machine wins on each count.

### Physical Size and Shape

The Model 100 slants slightly from 1.7" at the front of the case to 2.0" at the back. The NEC slants from 1.6" to 2.5". Thus, the NEC is slightly larger

but provides a more convenient viewing angle for the LCD screen. A tossup.

### Keyboard and Function Keys

The ENTER key is larger on the Model 100, a nice plus. Also, the NUM key on the Model 100 designates ten alpha keys as a numeric keypad; the NEC does not have this feature.

The Model 100 has a graphics control key that permits direct typing of 56 graphics characters and 17 other symbols (mostly mathematical). A CODE key gives the user access to three fractions and 58 foreign letters with various accents.

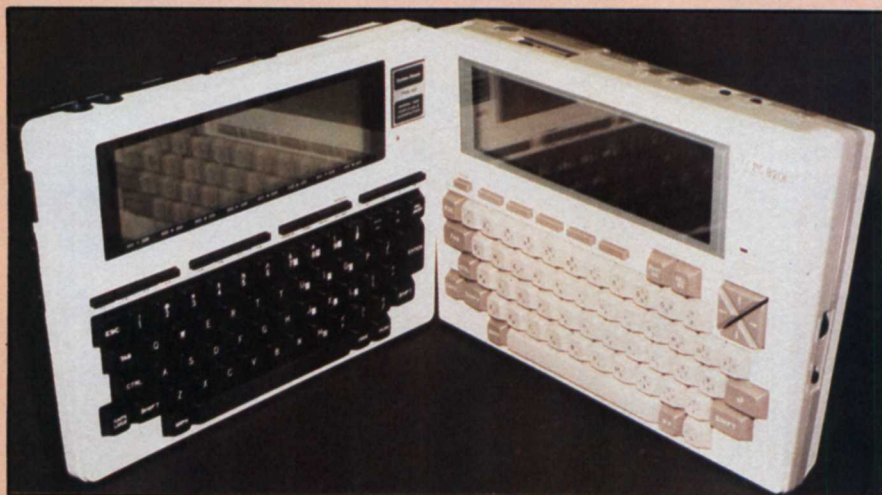
The NEC, on the other hand, offers 58 Katakana characters, not much to use here in the U.S., but only 16 built-in graphics characters. However, 61 characters are "blank" and may be user defined with a short program, CHRDEF, which comes with the computer on a demonstration tape. No clearcut victor here.

The /100/ has /eight/ function keys compared to five on the NEC, however, each of the five can select two functions by pressing the SHIFT key, making ten in total. The Model 100 has a PAUSE key; the NEC does not. Another tossup.

The cursor control keys are in a horizontal line on the 100 while they are in a much more natural sequence arrangement on the 8201. NEC wins this one.

### Memory and Interfacing

The low end Model 100 (\$799) has 8K of CMOS user memory while the low end NEC (no U.S. price yet) has 16K. A 24K Model 100 is also available (\$999) as well as an 8K upgrade kit (\$119 plus \$15 installation). The NEC machine can be expanded to 32K internally in 8K increments. In addition, an external plug-in 32K memory module is available. Files can be dumped to this memory module as to a cassette or disk; thus its name, Ram Disk. I like the NEC approach here.



Face-off: Radio Shack Model 100 (left) versus NEC PC-8201.



The Radio Shack Model 100 includes a 224-page manual and quick reference guide.



The NEC PC-8201 includes a user guide, Basic reference manual, demonstration tape (8 programs), and cassette cable.



It seems a shame that the power output from a full-size cassette recorder is required by these computers.

## A man and a young boy are looking at a computer game box titled "THE GAME SHOW". The man, on the left, is wearing a yellow cardigan over a plaid shirt. The boy, on the right, is wearing a red sweatshirt with white stripes on the sleeves. They are standing in front of a computer monitor displaying the game's title screen. The title screen shows three contestants on a game show set with the text "THE GAME SHOW" and "(To continue—press RETURN)". The game box is red and white, featuring the title "THE GAME SHOW" and a small illustration of the game show set. The box also has the text "Computer Advanced Ideas" and "CII" on it.

**CIRCLE 121 ON READER SERVICE CARD**

# Compute While You the Buffer that

Your computer is a real whiz when it comes to time. Like you, it works fast. But most printers don't. Most printers are *slow*. If you ever have to wait for your printer you are wasting time. Valuable time.

But with Microfazer, there's no more waiting.

Microfazer is the print buffer that frees your computer. That lets it work fast. That helps you work faster, too.

## THE "ANY COMPUTER ANY PRINTER" BUFFER

Microfazer goes with anything. Printers. Plotters.



any data processing environment, it's truly the "any computer any printer" buffer. With models for any data transmission need. Serial or parallel. Or to interface incompatible devices. And

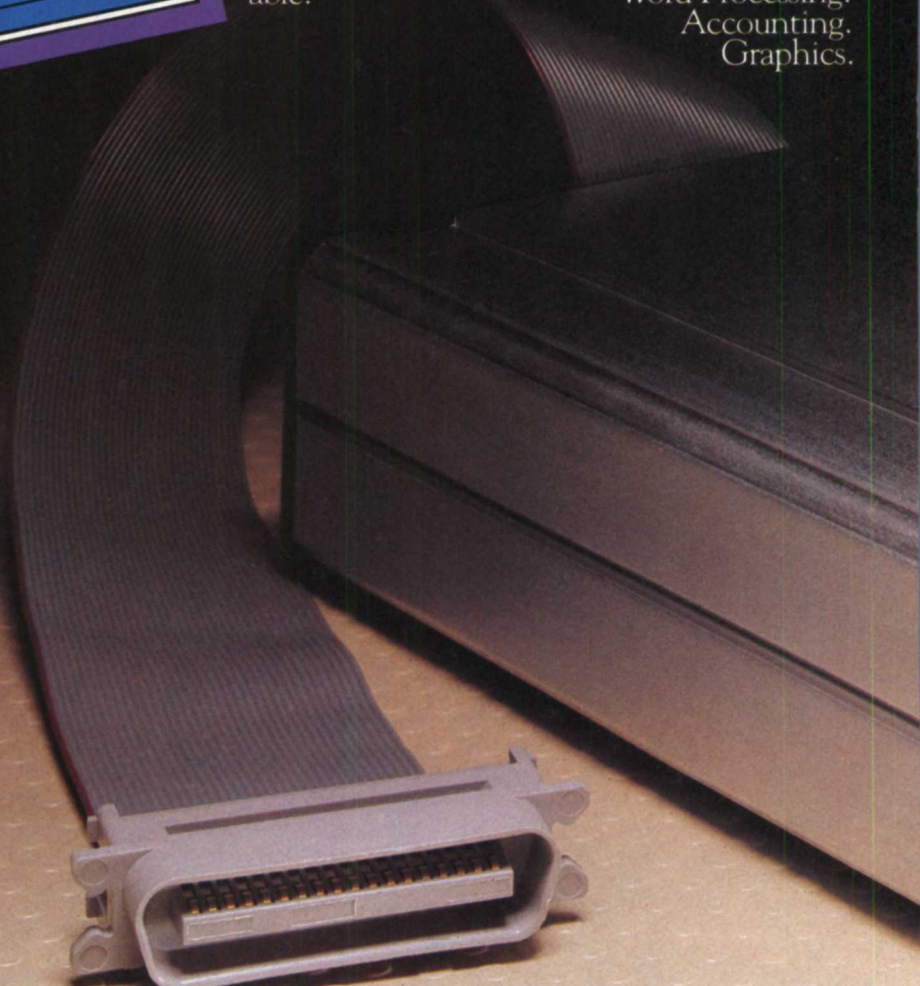
there's always the traditional Quadram Quality.

The assurance you are getting the finest buffer available.



**MICROFAZER  
REMEMBERS IT ALL**  
Microfazer stores data from your computer in its own memory, then sends it to the printer at a rate the printer can handle. And Microfazer can be expanded at any time to meet all your future requirements. The print buffer that offers 512K of memory—a full half-megabyte—Microfazer can handle *any* buffer task.

Word Processing.  
Accounting.  
Graphics.



Available at retail stores worldwide.

# Print with Microfazer,<sup>TM</sup> Remembers It All.

You name it.

So stop worrying about losing vital data because you run out of buffer space. Whatever the job—no matter *what* the size—Microfazer remembers it all.

## BUT MICROFAZER REMEMBERS MORE...

Microfazer remembers to give you the hardware features you're looking for in a print buffer. Features that include a Ready LED, manual Reset and Pause/Copy buttons. And Microfazer comes in a variety of convenient sizes. To

stand alone or stack with other peripherals. To snap onto the back of the popular Epson printer. There's even a model that plugs *inside* an Epson!



## AND PRICED RIGHT, TOO

And with Microfazer you don't have to wait because of price. Parallel to parallel versions start at \$159 (8K), serial to parallel and parallel



Special version for attaching directly to the popular Epson printer.

to serial versions start at \$199 (8K with cable), and serial to serial versions start at \$229 (8K with power supply).

Available in models from 8K to 512K.

So stop waiting on your printer. Compute while you print with Microfazer. You'll never have to wait again.



MICROFAZER.  
THE PRINT BUFFER.  
THAT REMEMBERS IT ALL.



**QUADRAM**  
CORPORATION  
A Division of Intelligent Systems.

4357 Park Drive / Norcross, Ga. 30093 / (404) 923-6666  
TWX 810-766-4915 (QUADRAM NCRS)

## Model 100, continued...

move the file back to the execution mode. Although in this manner all the functions of Text can be brought to bear on a Basic file, it is a curious arrangement. Still, it is better than my initial fear when first working with Basic—that screen editing was impossible. It is possible, though a bit inconvenient.

### Documentation

I don't need to say very much about the documentation that accompanies the package beyond the fact that it is superlative. It comes as a large spiral bound main reference and a small *Quick Reference Guide*. Both works are excellent. The main documentation is easy to read, simple to understand, and superbly indexed. The only thing missing

is a memory map. The reference guide is very handy.

I'm sure you can see that the pluses of the TRS-80 Model 100 outweigh the minuses by at least 5 to 1. And so I can candidly share the balance of the constructive criticisms I have of the unit, without changing your justifiably high opinion of it. Here we go:

### Criticism

- Cassette storage is a highly unreliable medium. I hate using conventional cassettes for anything other than audio applications. They are slow, flaky, and do not offer random access. To offer such a professional machine and then relegate users to cassette storage is like making them wear sneakers with a tux:

it's just out of place. Okay, the possibility of a disk drive connected to the expansion bus sounds feasible. But drives are expensive, heavy, and require AC. How about a portable *wafertape* unit (stringy floppy), to plug into the cassette port? This might be a very practical solution. In any case, cassettes don't make it, even at a respectable baud rate.

- How about some more memory? The NEC computer can handle 64K inboard, and is hardly bigger than the Model 100. Why was the capability cut in half?

- What happened to the user cartridge slot? The NEC computer has an expansion bus on the side and a provocative CMOS RAM cartridge among other

Both machines have a hefty operating system overhead which cuts into available user memory, 3130 bytes on the Model 100 and 4010 bytes on the NEC. In addition, the lowest 192 bytes cannot be used. For my purposes, this means that the low end 100 is totally impractical since it has only 4870 usable bytes (less than three double spaced pages of text).

Several problems result when memory capacity is approached. With 192 bytes left, (remember, they are unusable), the NEC refuses to do anything (print, save, transmit), yet with 193 bytes left, all is okay.

Memory capacity limitations rear their ugly heads much sooner on the

Model 100, particularly when editing Basic programs. For editing, the program must be swapped in and out of the Text area, hence your remaining memory must be twice the size of your program. Of course, you can modify programs without any swapping by retyping entire lines. Why Tandy didn't follow the lead of NEC and allow cursor-controlled on-screen editing of Basic programs is beyond me. But who knows, maybe that's what the extra 880 bytes of overhead on the NEC are for. No clear-cut winner here.

The left side of the NEC machine contains a 48-pin bus connector into which memory or other expansion cartridges can be plugged. The 8201, un-

like the Model 100, also offers a floppy disk drive interface. Both machines have an RS-232C interface, Centronics parallel printer interface, and bar code interface; the 8201 has an additional serial interface, which, according to NEC, is for an external memory device such as an external 128K RAM board. The NEC PC-8201 gets my vote here.

Both machines have built-in communications capabilities although the NEC does not have a built-in modem or the auto dial capability of the Model 100. Kudos to Radio Shack.

### Software

The Radio Shack Model 100 has five software packages built in: commu-



Outwardly, both machines appear virtually identical.



The four cursor keys on the Model 100 are in a horizontal line.



Model 100 keyboard includes a CODE key for foreign letters, NUM key for numeric keypad, and large ENTER key.

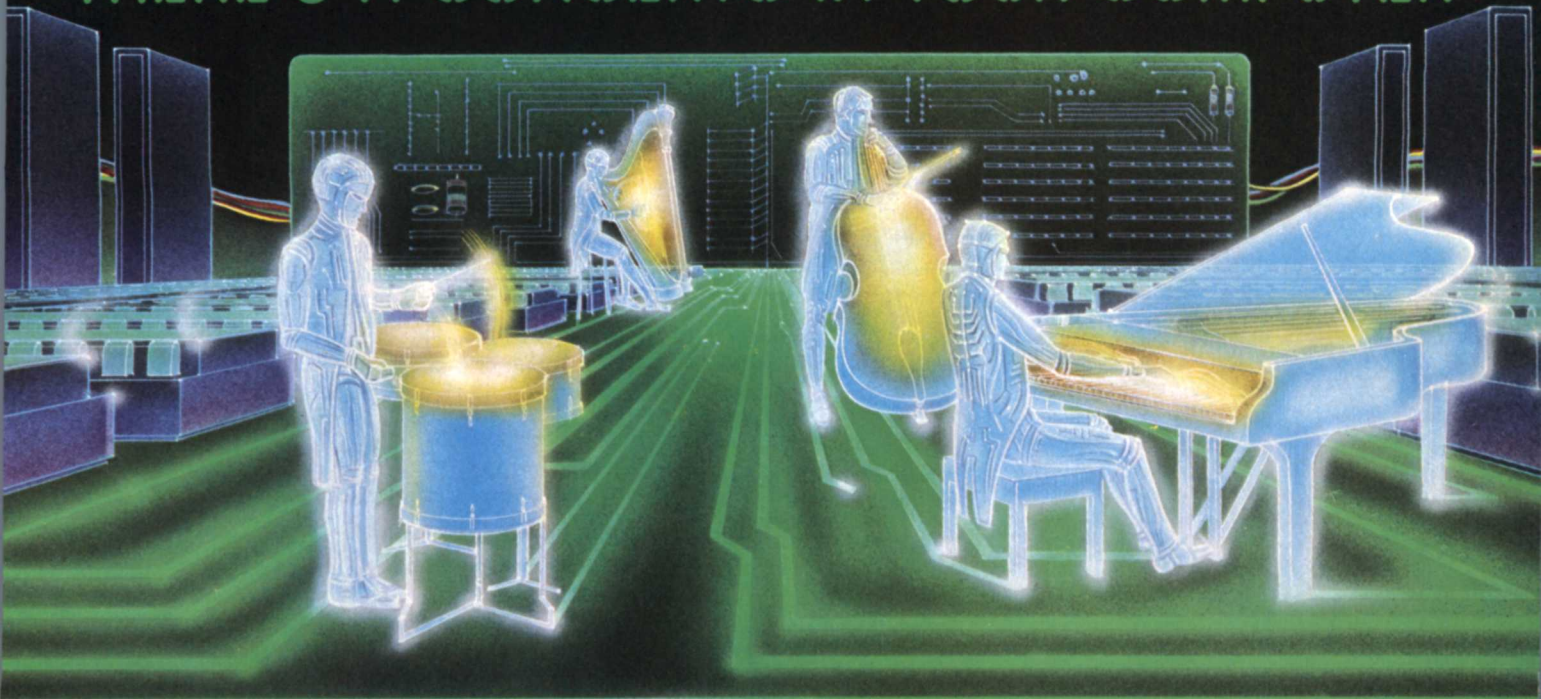


Cursor movement keys are laid out in a logical pattern on the NEC 8201.



NEC 8201 has Katakana key, no numeric keypad, and smaller ENTER key.

# THERE'S A CONCERTO IN YOUR COMPUTER



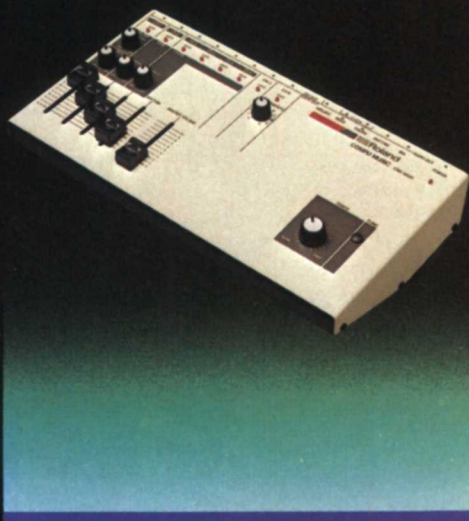
## COMPU-MUSIC

... And a waltz, a blues song, a rhapsody, and a whole lotta rock n roll. In fact, your computer can now play any kind of music, thanks to the new Roland Compu-Music.

Roland, the world's leading producer of synthesizers and electronic musical instruments, has put its years of music programming experience into a high performance computer/music synthesizer system that can easily be used by anyone—from the computer-user with a musical background to the programmer with a song in his heart.

The Roland Compu-Music does for music what the word processor has done for words. The Compu-Music

software allows your computer to write, program, change and store musical compositions of up to eight voices, plus a seven voice electronic drummer. The Compu-Music hardware (CMU-800) is a music synthesizer that plays these musical parts.




The CMU-800 connects to your computer through any auxiliary slot and then connecting to any amplifier or stereo system for performance. Because the Compu-Music system is software based, it allows for virtually infinite hardware expansion. It can never become obsolete.

Playing and programming the Compu-Music is so easy that you don't have to be a musician, but if you are, you'll appreciate the well-thought-out programming, a system that Roland has used for many years with proven success. Also, the CMU-800 hardware easily interfaces with many other synthesizers for expanded performance—all controlled by your computer.

The Roland CMU-800

Synthesizer retails for \$495.00. The Compu-Music Software retails for \$70.00 and is available for the Apple II and NEC computers. For more information, see your computer dealer or contact: RolandCorp US, 2401 Saybrook Avenue, Los Angeles, CA 90040 (213) 685-5141.

CIRCLE 255 ON READER SERVICE CARD

 Roland

We Design The Future

## Model 100, continued...

plans (see sidebar). Why was this phased out?

- Why is the auto-dial feature limited to pulse dialing, disallowing its use on some touch tone-only exchanges?

- Why the linear cursor control? The NEC uses a very nice triangulated square format to provide a directional cursor layout. Why was this canned?

And most important of all:

- Why is the Model 100 so expensive? Sure, CMOS technology is still young, and CMOS ROM and RAM are much more costly than conventional memory. Still, at over \$1000 a pop for a maximally configured machine, only those with a nose for novelty will run out to buy. I have a strong hunch that because the 100 has no real market rivals right

now, "profit-taking" (as they say on Wall Street) may be the order of the day. As soon as other machines as practical as the 100 appear, prices will begin to drop. And they will keep on dropping. At \$299 for a Model 100, even *Creative Computing* Managing Editor Peter Fee will start thinking about buying one.

One further note. A couple of days before the Model 100 showed up at the lab, I read an understated but positively disquieting little pamphlet from Canada concerning the dangers of VDTs ("video display terminals," new vogue acronym for CRTs, monitors, video tubes).

While it took pains to label all results inconclusive, it pointed a wary finger at the tubes, and said that while they may not cause cataracts, they may cause eye-

strain, migraine, and back pain. I also got the vague impression that pregnant ladies should stay the heck away from them.

Well in my job, I spend all day in front of a CRT, then go home and spend half the night in front of another one. Of course, I take some time off. Then I usually watch TV. Then I wonder why my eyes are glazed.

Well the Model 100 has helped me to relax a bit about those fears, by allowing me to do serious data processing away from the gamma glow. I am sure that in the future I will spend much less time basking in phosphor x-rays. And until they show that LCDs are bad for you too, I'll stick with the TRS-80 Model 100. □

communications, text editing, Basic, appointments scheduling, and address handling. The NEC offers only the first three of these. The Model 100 is a clear victor.

### Documentation and Extras

The 224-page spiral bound manual with the Model 100 is excellent—by far Radio Shack's best manual to date (except for the Color Computer manuals which are also excellent). In Japan, the 8201 comes with two 6" × 8½" manuals, each with 200 pages. One is a user's manual, the other a Basic reference manual. (I assume these will be translated for the U.S. market). The Model 100 also comes with a 50-

page pocket reference guide, something not included with the NEC. Since I can't read Japanese, I'll give the nod to the Model 100 for documentation.

On the other hand, the 8201 includes a demonstration tape of eight programs including two games played on the LCD screen. These, incidentally, would not run on the 100 because of the missing LOCATE command.

The 8201 also includes a cassette cable, a \$5.95 extra with the Model 100. A printer cable for each will set you back another \$14.95, although I was charged \$19.95 in a Los Angeles area Radio Shack (is there a higher price west of the Rockies?).

The modem cable costs \$19.95 anywhere. For included extras, the NEC wins.

Incidentally, neither machine will operate with most pocket microcassette recorders. These small units just don't have the output power to drive the computer cassette interface. The smallest one I found that works is a Panasonic RQ-8300, a unit specially designed for use with a computer.

Both computers use four AA batteries for regular operation while built-in NiCad batteries keep the memory

and clock going. The NEC has a removable AA battery housing, an extra one of which is available, but it is not clear that this is any handier than carrying four spare AA cells.

### The Bottom Line

Pros of the Radio Shack Model 100 are its slightly smaller size, large ENTER key, numeric keypad option, extensive built-in graphics character set, pause key, 880 fewer bytes of overhead, built-in modem with auto dial capability, and five built-in programs compared to three on the 8201.

Pros of the NEC PC-8201 are its slightly better viewing angle, ten function keys, logical cursor movement keys, on-screen Basic program editing within Basic, definable graphics characters, LOCATE command for graphics, side expansion connector and external 32K memory cartridges, floppy disk interface, and included cassette cable and demonstration tape.

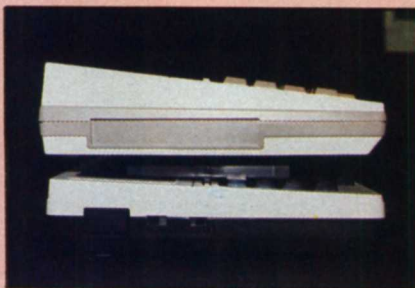
Which is the winner? You are, the customer. They are both great machines and if you have trouble deciding between them, why not do as I did and get one of each? That's the best of all possible worlds. □



Model 100 main menu includes five built-in programs and notes day of week.



NEC 8201 has three built-in programs. Eight functions (Load, Save, Name, etc.) can be selected by function keys from the main menu.



Side view shows higher profile of the NEC 8201 (top) compared to the Radio Shack Model 100. NEC has cartridge slot; Model 100 does not.



I/O connectors on the NEC 8201 (bottom) are covered with plastic doors (the printer door is removed) while the connectors on the Model 100 are exposed.



# THE PERSONAL PRINTER BUILT LIKE A SHERMAN TANK PERFORMS LIKE A CONCERT GRAND.

**Why We Get Encores.** Okidata takes center stage with a cast of printers that can't be outperformed. All eight dot matrix printers offer you more features for your money than you can find anywhere else. Pick your tempo: data processing at speeds from 80 to an exceptional 350 cps; to stress a point, enhanced and emphasized printing at up to 100 cps; outstanding letter quality printing at speeds three times faster than most daisywheels — up to 85 cps. Add a full range of graphics capabilities, down-line loadable character sets for creating personalized typefaces and symbols, and your print repertoire is virtually unlimited.

**We Play On and On.** Our virtuosos feature rugged steel frames, laser-

welded parts, and our long-life, non-ballistic print head warranted for up to one full year. With this tank-toughness you'd expect Okidata to have the lowest warranty claim rate in the industry. And we do: less than 1/2%.

**In Tune with All Major Computers.** We've designed each of these finely tuned instruments to be harmonious with all the major names in personal computers. And to give you more than you'd get from the major computer name printers. After all, we specialize in printers. The computer folks specialize in computers. (That's why MOST buy their printers from somebody else).

**Larger Selection. Smaller Prices.** Because we make more printers than anybody else, we can give you just the

right one to fit your specific needs. Not to mention your budget. Suggested retail prices range from \$449 to \$2995. Call 1-800-OKIDATA (in NJ, 609-235-2600) for the dealer nearest you. Both you and your computer will enjoy the performance.



## OKIDATA

Mt. Laurel, NJ 08054

A subsidiary of Oki Electric Industry Company Ltd.

CIRCLE 165 ON READER SERVICE CARD



by  
Dave  
Eisler

## It's midnight... Do you know where your monsters are?

It's the dead of night. You're the master of the graveyard. The monsters are a wild and lively bunch who like to party and raise the dead. Can you use the Monster Smasher System and keep them where they belong ... six feet under? Only \$29.95 for your Apple\*, Commodore 64\* or Atari\*. Available at your computer dealer, or:

 **DATAMOST**

Copyright 1983 Datamost Inc.

8943 Fullbright Avenue, Chatsworth, CA 91311-2750 (213) 709-1202

VISA/MASTERCARD accepted \$2.00 shipping/handling charge. (California residents add 6 1/2% sales tax.)

Apple, Commodore 64, and Atari, are trademarks of Apple Computer Inc., Commodore Business Machines, and Atari Inc., respectively.

CIRCLE 138 ON READER SERVICE CARD



# Texas Instruments CC-40

When I first saw the Texas Instruments Compact Computer 40 (CC-40) I assumed it was a diminutive example of the notebook computer. Notebook computers are a new breed of machine. They are small (notebook-sized) computers that feature a type-writer style keyboard, a nonvolatile memory that retains information in memory when the computer is turned off, and a built-in display screen.

Closer examination, however, reveals

## Joe Devlin

that although the CC-40 is quite a little powerhouse and has much in common with the notebook machines, it lacks some of the features needed to compete in the notebook class.

The CC-40 is a handsome silver computer the size of a large paperback novel. This small size (9.5" x 5.75" x 1") is one of the factors that places it in the pocket computer rather than the notebook class. The machine is slightly larger than most of the hand-held computers such as Radio Shack's PC-2 and PC-4 and the Hewlett-Packard HP-75C, but smaller than notebook machines such as the Radio Shack Model 100. As such, the CC-40 provides a link between the hand-held programmable calculator and the desktop personal computer. The CC-40 packs a lot more

power than most of the pocket units, but this power is trapped within a tiny body that makes it hard for the CC-40 to express itself.

### CMOS Processor

The heart of the CC-40 is an 8-bit CMOS processor. CMOS processors use very little power as compared with normal chip technology. This means that the CC-40 can be powered by batteries alone. More important, memory can be sustained, even after the machine has been turned off, with very little drain on the batteries.

The four AA alkaline batteries that power the system will last for up to 200 hours of powered-up use and will maintain your program in memory for months. Type in a program, turn the machine off, and the program will remain in memory and reappear when the machine is turned back on and the program is called back.

### The TI CC-40

#### At a Glance

**Computer:** Texas Instruments CC-40

**Microprocessor:** 8-bit CMOS TMS 70C20

**RAM Memory:** 6K standard, 18K maximum

**ROM Memory:** 34K with Basic

**Language, standard:** TI Basic

**Languages, optional:** Editor/assembler

**Keyboard:** calculator style, numeric keypad

**Display type:** LCD

**Character resolution:** 1 line x 31 characters

**Graphics resolution:** 1 x 31 (5 x 8 dots)

**Mass storage:** cassette, disk, wafertape, plug-in cartridge (up to 128K)

**Interface, standard:** 8-pin Hex bus

**Interface, optional:** RS-232

**Size, Weight:** 9.5" x 5.75" x 1", 1 lb., 6 oz.



*The CC-40 is not much bigger than the instruction manual. Keys are calculator-style, but have positive action and both tactile and aural feedback.*



Directional keys control position of cursor and LCD display (1 line x 31 characters) within program. Black markings over keys are actually on a removable, transparent overlay. Reset button is flush with the case to prevent accidental activation.

In addition, there is an automatic power down feature that shuts the machine off when it is left unattended for more than ten minutes. If you prefer, the unit may also be connected to an optional \$15 AC adapter and plugged into a wall outlet.

#### A Tour Of The Keyboard

The keyboard on the CC-40 features a well built miniaturized typewriter-style (QWERTY) key arrangement and a nu-

meric keypad. A tilt stand is built into the back of the console to provide an optimum viewing and keying angle.

By using the left SHIFT key, the typist can type both upper- and lowercase letters. The uppercase lock is activated by pressing the SHIFT and UCL keys simultaneously. The uppercase lock causes all the alphabetic keys to be shifted to uppercase while leaving the operation of the numeric and punctuation keys unshifted.

There is no right shift key; there is an ENTER key where the right shift key would be.

The numeric pad on the right includes the numbers 0 to 9 arranged in calculator fashion and a few other keys. Above the numbers on the top row of the pad lie the four cursor control keys. The right and left cursors provide easy access to an 80-character line even though only 31 characters are displayed. The other two cursor keys provide an easy way to page through the lines of the program stored in memory.

Above the numeric pad is a row of keys that includes, the ON and OFF keys along with RUN and BREAK. The BREAK key will halt an executing program. Pressing the RUN key followed by ENTER causes the current program in memory to execute.

#### The Display

The CC-40 uses a single-line, 31-character liquid crystal display (LCD) screen capable of supporting both upper- and lowercase letters as well as numbers and a variety of special graphics characters.

The display can be scrolled back and forth revealing a 31-character window that opens upon the 80-character screen memory. A contrast control (actually display angle) is provided to adjust the screen for optimum viewing.

The LCD screen also displays several special status indicators above and below

I recently wrote a book, *The Texas Instruments Home Computer Ideabook*. As a result, I became very familiar with TI 99/4A Basic, a bare bones implementation of the language with virtually no bells and whistles. Hence, it was with mixed emotions that I approached the CC-40.

My excitement started to build as I read the first few sections of the manual. Good grief, could CC-40 Basic really have come from the same folks in Texas who brought us 99/4 Basic?

The CC-40 has a truly excellent Basic. In addition to all the expected commands and functions, there are some that set this computer apart.

- 15-character variable names.
- 1-, 2-, or 3-dimensional arrays.
- Function calculations in either radians or degrees.
- Multiple statements on one line.
- Accuracy to 11 decimal places.
- Numeric range from  $10^{-128}$  to  $10^{126}$ .
- Logarithmic functions LOG and LN.
- Six trigonometric functions including arcsin and arccos.
- Subprograms using SUB and CALL.

## TI Compact Computer 40 Basic

David H. Ahl

- Functions to provide both floating point and integer random numbers.
- Five methods of entering input data: INPUT, LINPUT, ACCEPT, KEY\$ (like INKEY\$ in other versions of Basic), and CALL KEY (reads keyboard buffer without halting program).
- Two methods of displaying output data: PRINT and DISPLAY (more versatile than PRINT). IMAGE can be used to format either PRINT or DISPLAY (similar to PRINT USING).
- Ten user-defined function keys with up to 80 characters per function. A function can be an entire subprogram callable from either Basic or immediate mode.
- Immediate mode calculations do not require a PRINT statement to precede the calculation. In this sense, the CC-40 is exactly like a powerful scientific calculator.
- Automatic line numbering and renumbering commands.
- Quotation marks possible within a string, for example, the following is a legal string:  
She said, "I love you," and left.

- Simplified editing of Basic statements. The cursor keys are used to move within a statement. When a change has been made, RETURN is pressed without having to move the cursor to the end of the statement.

Of course, there are some idiosyncrasies as well. The first program I wrote (a very simple one) just would not display any output. I finally traced this to the fact that the output was displayed so quickly that it could not be seen before the computer went on to the next command (or stopped). When the CC-40 finishes a program, the last line of output is not left on the screen; presumably this is to conserve battery life. Hence, to see any output, you must instruct the program to pause briefly before going on. Fortunately, this is easily done with the PAUSE command which causes the CC-40 to pause for the number of seconds specified, i.e., PAUSE 2 pauses for two seconds.

Bottom line: CC-40 Basic is one of the best I have seen and is all the more remarkable for being on a computer this size.

# IF PERSONAL COMPUTERS ARE FOR EVERYBODY, HOW COME THEY'RE PRICED FOR NOBODY?

A personal computer is supposed to be a computer for persons. Not just wealthy persons. Or whiz-kid persons. Or privileged persons.

But person persons.

In other words, all the persons whom Apple, IBM, and Radio Shack seem to have forgotten about (including, most likely, you).

But that's okay. Because now you can get a high-powered home computer without taking out a second mortgage on your home.

It's the Commodore 64. We're not talking about a low-priced computer that can barely retain a phone number. We're talking about a memory of 64K. Which means it can perform tasks most



**\$1395\***  
APPLE® IIe 64K

**\$999\***  
TRS-80® III 16K

**\$1355\***  
IBM® PC 64K

other home computers can't. Including some of those that cost a lot more. (Take another look at the three computers above.)

By itself, the Commodore 64 is all the computer you'll ever need. Yet, if you do want to expand its capabilities some day, you can do so by adding a full complement of Commodore peripherals. Such as disk drives. Modems. And printers.

You can also play terrific games on the Commodore 64. Many of which

will be far more challenging than those you could ever play on a game machine alone. And as great as all this sounds, what's even greater-sounding

is the price. It's hundreds of dollars less than that of our nearest competitor.

So while other companies are trying to take advantage of the computer revolution, it seems to us they're really taking advantage of something else:

Their customers.

\*Manufacturers' suggested list prices as of March 20, 1983. Monitor included with TRS-80 III only. Commodore Business Machines, P.O. Box 500R, Conshohocken, PA 19428; Canada—3370 Pharmacy Avenue, Agincourt, Ont., Can. M1W 2K4.

**commodore**  
COMPUTER

Apple is a registered trademark of Apple Computer, Inc. TRS-80 is a registered trademark of Tandy Corp. IBM is a registered trademark of International Business Machines Corp.



**THE COMMODORE 64™. UNDER \$600.\***

You can't buy a better computer at twice the price.

CIRCLE 118 ON READER SERVICE CARD

## TI CC-40, continued...

the single line text display. These indicators warn when the uppercase lock has been set and when the function or control keys have been activated. Other indicators show if degree, radian or grad modes are active, whether I/O is in progress, if left or right scrolling or one of six user-settable flags has been set, if there has been an error, or if the battery is low.

### Is There Such A Thing As Too Small?

There is a great deal of power in the little mite. The problem is that the human interface is not all it might be. This is primarily the result of the small size of the unit which necessitates the use of the single line LCD display and the calculator style keyboard.

I suppose it won't be long before it will be technically possible to produce a computer the size of an olive. Imagine trying to work a keyboard the size of an olive pit! Fortunately the keyboard on the CC-40 is calculator sized rather than olive pit sized.

Calculators, however, are worked with a single hand. The keys on the CC-40 are so closely spaced that single finger pecking rather than touch typing is the usual mode of data entry. On the other hand, the keys have positive action and provide both aural and tactile feedback. There was no hint of the keybounce that is a frequent plague on other computers with "Chiclet" style keys.

The single line LCD display aggravates the problem with working with the machine. It is difficult to enter and edit either text or a program when you can see only a portion of one line of text at a time.

### Documentation

The User's Guide that comes with the CC-40 is slightly smaller than the computer. It is divided into five chapters, twelve appendices, and an index. It is a thick, well written tome that covers all the ground it should. One nice feature is an alphabetically arranged section with a page-long explanation of each Basic command, function, and built-in subroutine.

### Basic

The Basic included in CC-40 ROM is a sophisticated one, with many features that appeal to those who are used to programming in higher level languages such as Fortran. Along with all the standard PEEKs, PRINTs, LISTs and control loops, the CC-40 provides several interesting bells and whistles.

For example, CC-40 Basic contains an ACCEPT command which accepts data at any position in the display, can sound an audible beep to alert the user that data

are being solicited, checks the data for type (numeric, positive, negative, character) and length, and provides a de-

***The designers have thoughtfully provided function keys that will enter an entire command at the press of two keys.***

fault in case null data are input. What convenience! What class!

CC-40 also provides an IMAGE command that allows Fortran-like format-

ting of output data. PAUSE waits for any key to be pressed, or for a specified length of time (good for waiting for user acknowledgement that a message has been read). The ON ERROR command allows the programmer to preset the action to be taken when an error occurs during the execution of a program. The DEBUG command allows access to an assembly language debugger. INDIC lets you set display indicators on or off through software. In short, there is a lot to this Basic.

The most wonderful feature in CC-40 Basic is the provision for full parameter passing, by value and by reference in subroutine calls (called subprograms by TI) through the CALL statement. The programs in the box below perform almost the same functions. One is written in standard Basic, using GOSUB (which is

Subprogram SUMIT in Listing 2 and the subroutine in lines 200-230 of Listing 1 both add two numbers and store them in a variable called SUM. The only difference is that subroutine 200-230 zeroes variable B and SUMIT does not touch it.

Unlike a standard Basic GOSUB, the CALL statement includes a list of the variables that the subprogram will use from the calling program. Any other variables mentioned in the subprogram are unique to it, and the storage for them is not retained when the program exits the subprogram (as, for example, variable A). Notice also that two of the variables being passed to subprogram SUMIT are in parentheses. This means

that only their values are passed. SUMIT cannot change the values of J and B; it knows only what their values were when SUMIT was called. (This is just as well, because if J were set to zero, our FOR...NEXT loop would be messed up.) SUM, however, is passed by reference, which means that SUMIT is free to change it, which it does, by returning the SUM of J+B in it. The J, passed by the CALL, is renamed A inside the subprogram. Any integer can be passed to SUMIT, and we do not always have to store it in a variable with the name J before calling SUMIT.

#### Listing 1.

```
10 REM GOSUB VERSION
20 FOR J=1 TO 100 STEP 1
30 A=J*5
40 B=A+10
50 GOSUB 200
60 PRINT A,B,SUM
70 PAUSE
80 NEXT J
90 STOP

200 SUM=A+B
210 A=0
220 B=0
230 RETURN
240 END
```

#### Listing 2.

```
10 REM CALL VERSION
20 FOR J=5 TO 500 STEP 5
40 B=J+10
50 CALL SUMIT (<J>,<B>,SUM)
60 PRINT J,B,SUM
70 PAUSE
80 NEXT J
90 STOP

200 SUB SUMIT(A,B,SUM)
210 SUB=A+B
220 A=0
230 B=0
240 SUBEND
250 END
```

industry breakthrough.



VIDEO-300

## NEW 2 (yes TWO!) YEAR UNCONDITIONAL WARRANTY ON ALL AMDEK MONITORS

It's new . . .

It's exciting . . .

. . . another first for the industry with Amdek's bold 2-year warranty on monitor electronics . . . and an unprecedented 3-year warranty on monitor CRT's. Yes, it includes all parts & labor! And, all warranties in existence are automatically extended to the new 2-year warranty.

Amdek has always been thoroughly committed to the highest quality standards . . . quality that's inherent in every monitor component and every connection . . . quality that's triple checked before every shipment. That's why we dare to offer this extended warranty.

You expect top quality equipment to operate trouble-free for years. We agree. This industry-first warranty is our answer to your expectations. Enjoy Amdek performance . . . and keep coming back for more!

See our complete line of color and monochrome monitors, plus the new 3" disk drive, plotters and expansion boards at your local authorized Amdek dealer.



COLOR-II

# AMDEK

2201 Lively Blvd. • Elk Grove Village, IL 60007  
(312) 364-1180 TLX: 25-4786

REGIONAL OFFICES: Calif. (714) 662-3949 • Texas (817) 498-2334

Amdek . . . your guide to innovative computing!



COLOR-III

## AMDEK OFFERS LOCAL SERVICE ON ALL PRODUCTS

Now 120 Xerox service centers across the USA are equipped to service all Amdek monitors, plotters and new 3" micro-floppydisk drives. Contact your local Amdek dealer for more details.

**AMDEK**

## TI CC-40, continued...

available on the CC-40 for those who want such things). The other uses parameter passing by reference and by value to create a much neater version.

Structured programmers will be delighted with this CALL instruction. And even those who are not always as structured as others might like them to be will find it exhilarating to be able to name a function, instead of just giving it a number. CALL statements can also be used to access some built-in subprograms such as CLEANUP, which deletes unused variable names from the system and SETLANG, which can change the language in which the prompting messages are displayed.

This Basic is nifty. Not only that, but despite the small size of the keyboard, it is easy to enter. This is because the designers have thoughtfully provided function keys that will center an entire command at the press of two keys. The plastic keyboard overlay provided with the machine is the path to easy access of Basic keywords. Hold down the FN (function) key on the numeric pad, press the appropriate key as indicated by the keyboard overlay and *voila!* Basic in an instant. Control functions are similarly accessed by pressing the CTL key followed by some other key.

The programmer who wants more than the built-in Basic commands can program his own user-assigned strings. These can be strings of characters, commonly used math expressions, or even memos of up to 80 characters. User-assigned expressions can be recalled by hitting the FN key along with the numeric key (1 to 9) assigned to the phrase.

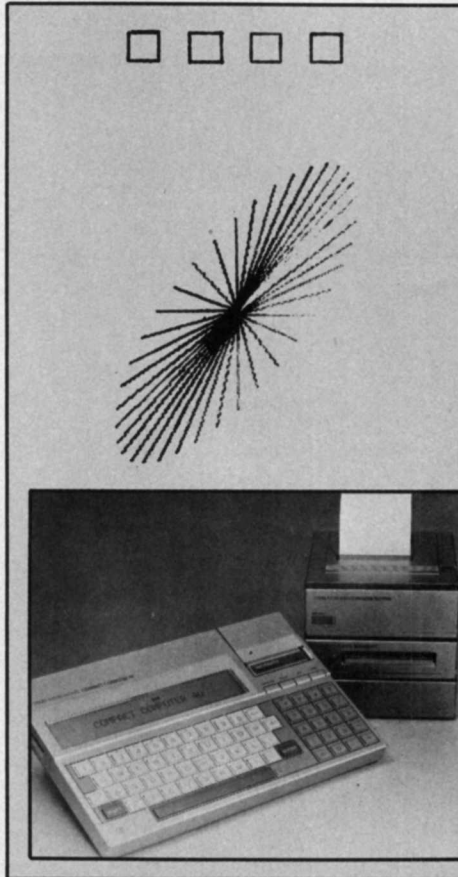
All Basic calls, whether typed in or entered with the help of a function key, are edited with the line editor. Left and right arrows allow for non-destructive movement through the text line. Up and down arrows move you from line to line, as does the LIST key. Individual characters in a line can be deleted or inserted. A character is changed by being typed over.

One quirk of this editor is that to delete an entire line you must DELETE it—just typing its line number does not suffice. I won't get into a debate as to whether this is a safety feature or just a pain.

## I/O

There are two openings on the back of the unit. The most important is the 8-pin hex-bus peripheral port. Three peripherals that plug into the hex-bus port are currently offered—an RS-232 interface, a printer/plotter, and a wafertape drive. Next to the peripheral port is a socket for attaching the AC adapter. The cartridge port, which can accept either ROM cartridge software or

*This figure, plotted by the program below, was printed by the TI Printer/Plotter shown in the photograph.*



memory expansion cartridges, is located in the upper righthand corner of the CC-40. On the bottom is a panel that covers the battery compartment.

## Peripherals

Even though the CC-40 has a permanent memory, the size of that memory is limited to 18K, and sooner or later most users will want to save information on an external storage device. For this purpose Texas Instruments offers a \$140 Wafertape drive (also called a stringy floppy). It uses removable, continuous-loop cartridges that can store up to 48K. Continuous-loop cartridges offer a compromise between faster but more expensive disk storage and slower but less expensive cassettes.

Those who wish to attach a modem or 80-column printer to the computer can purchase an RS-232 interface for \$99.95.

The x-y printer/plotter uses four tiny ballpoint pens to sketch color graphs or to print up to 11 characters per second. The plotter uses 2 1/4" wide plain paper and costs \$199.95. The three peripherals are desktop units, not designed to be portable. Each is packaged in a silver box designed to be stacked one on top of the other, taking up the minimum amount of space on a desk.

```

20 INPUT "Enter major axis radius(0-100)";A
25 IF A>100 THEN 20
30 INPUT "Enter minor axis radius(0-100)";B
35 IF B>100 THEN 30
40 INPUT "Phase relationship(-90-90)";ROTATION
45 IF ROTATION>90 OR ROTATION<-90 THEN 40
50 PRINT "Pen color":PAUSE 1
60 INPUT "1-black 2-blue 3-green 4-red";COLOR
65 IF COLOR<1 OR COLOR>4 OR COLOR<>INT(COLOR) THEN 60
100 DEG
110 OPEN #1,"10",OUTPUT
120 PRINT #1,CHR$(19)
130 PRINT #1,"M(110,-120)"
140 PRINT #1,"0"
145 PRINT #1,"C";STR$(COLOR)
150 FOR TA=0 TO 359 STEP 10
160 X$=STR$(INT(B*COS(TA)))
170 Y$=STR$(INT(A*SIN(TA-ROTATION)))
180 PRINT #1,"L(0,0),("X$","Y$)"
"
190 NEXT TA

```

## Software

It is likely that most of the initial software packages for the CC-40 will be produced by TI. There are several factors that may prove to be barriers to the rapid proliferation of software for the

CC-40. The CMOS processor that is the heart of the CC-40 is relatively new and has never before been used as the CPU of a microcomputer. The Basic built into the machine is very powerful but not necessarily compatible with software offered for the popular Texas Instruments 99/4A computer. Neither the cartridge nor the Wafertape cassette is compatible with previous offerings by Texas Instruments.

Software for the CC-40 will be made available on either plug-in ROM cartridges or Wafertape. ROM cartridges retail for from \$40 to \$125. Initial offerings include *Mathematics*, *Finance*, *Perspective Drawing*, and *Business Graphics*. Wafertape cartridges sell for \$19.95 and include *Elementary Dynamics*, *Production and Planning*, *Inventory Control*, *Photography*, *Electrical Engineering*, and *Profitability Analysis*.

For the CC-40 to become a success, it will have to find a niche for itself. There is no way that a calculator sized computer with a single-line LCD and a Wafertape drive will be able to perform many of the tasks performed by a personal computer with a full sized display screen, keyboard, and disk drive.

Nor will this machine be competitive in the world of notebook computers. Most notebook computers see a great deal of use as portable word processors, and the single-line display, tiny keyboard and minimal editor of the CC-40 limit its use as a word processor.

The most likely market for the CC-40 is probably in competition with hand-held computers like the Hewlett-Packard 75C or the Radio Shack PC-2 and PC-4. The CC-40 is well equipped to compete in this market.

The permanent memory and powerful Basic exceed the capabilities found in most hand-held computers. The large size of the machine results in a larger typewriter style keyboard, which, though not meant for touch typing, is better than that found on any hand-held.

The CC-40 is an attractive machine, even with its drawbacks. Just look at the possibilities it offers. If you are looking to learn Basic, it offers a very powerful and portable learning tool. If you are a salesman or engineer, it will calculate the solutions to formulas you use every day. If you are a student, about to take a Physics test—oh what a crib sheet you could create! Not only will the CC-40 keep track of all those equations you never memorized, but it will hold the comments you need to remind you which formulas are needed in which situations. And once the proper formula has been found, just key the variables into the equations and the machine will provide you with all the answers. □

CIRCLE 401 ON READER SERVICE CARD

August 1983 © Creative Computing

I have been using  
**TransForm** for all  
kinds of programming  
... my time has been cut in half...  
this is one of the very few utilities  
I have never regretted  
purchasing for one  
instant.

by Dr. J.C. Gilland  
Graphion/Vortex

Whether you are just a beginner, someone reasonably familiar with programming, or a veteran, **TransForm** can help you.

#### What is TransForm?

**TransForm** is a better way to write programs in Microsoft BASIC®. It is a structured translator which does away with the constraints of line numbers and the single line IF. It adds the high level structures of the block IF-ELSEIF-ELSE-ENDIF, REPEAT-UNTIL, and ON-GOTO-ENDGOTO—similar to languages like Pascal. Symbolic labels are used (such as "GOSUB @ QUICKSORT"). A very versatile INCLUDE-DECLARE feature has been added to enable you to build a library of the subroutine modules you use every day—write it once, then INCLUDE it. High level, structured code in—ordinary BASIC out. It's that quick and easy.

**Now! Three great ways to order TransForm:**  
**The TransForm Tutor.** Wanting to learn how to write clean, reliable, structured programs? Let the Tutor teach you with its detailed, easy to learn, step-by-step examples and tutorial. **Only \$39.95!**

**The TransForm Standard.** Already familiar with structured programming? The Standard begins with a more complex example (a utility program) so you can dive right in. **Only \$39.95!**

**The TransForm Expert.** Writing complex program series as a professional? The Expert provides the additional utilities of a source code formatter, destination code optimizer (for use with BASCOM® 5.3), and a "REL" file disassembler. Everything you need to master your applications. **Only \$39.95!**

Place your order for **the Tutor, the Standard, or the Expert** toll free now: **1-800-845-7055.**

Direct technical questions to 1-803-244-8174.

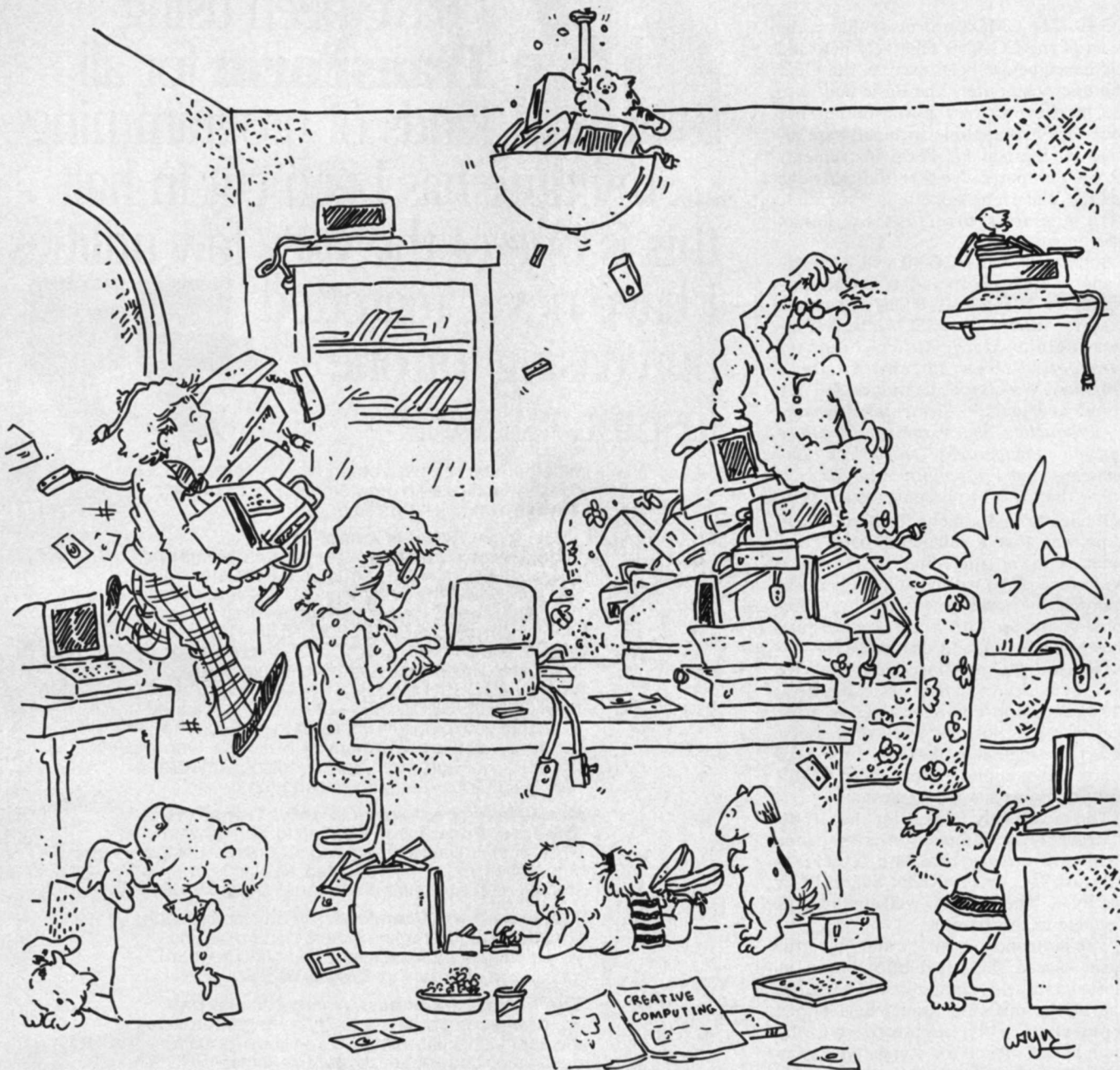
VISA, MC, COD, company PO, or check accepted. For CP/M.\*

\*Introductory price.

**From the same company that created MCDISPLAY, the powerful display interface for Microsoft BASIC which allows you to develop screen-oriented application packages.**

**MCI Master Computing Inc.**

**"Practical Solutions Through Technology"**  
**A Division of EDI Technology Companies**  
**11 Regency Hills Drive, Greenville, SC 29615**  
CIRCLE 160 ON READER SERVICE CARD



## Our Readers Buy More Computers

Did you know that almost 90% of the readers of *Creative Computing* use a computer regularly? Of those users, 86% use a computer at home, 75% at work and 18% in school or college.

Moreover, of the readers who own computers, 17.5% own two machines and 5.4% own three or more. Yes, own. This doesn't mean using a company computer at work, and a personal one at home. This means that 23% of our readers *own* more than one computer of their own. And thousands more plan to buy a second or third computer.

So it's no wonder that our average reader has invested \$4230 in his system. That's a lot more than the average personal computer owner.

Moreover, 84% of our readers give advice to others on what system to buy and 58% are directly involved in the computer purchasing decisions for their company.

The average *Creative Computing* reader is college educated, 37 years old, has a household income of \$43,840, and spends a bundle on computers and software.

So if you have a great product to sell and want to reach a buying-oriented audience of nearly a third of a million, give us a call.

## creative computing

# After you ask what it can do for you now, ask what it can do for you later.

If you're about to buy a personal computer, you need to consider two basic issues: What your needs are now, and what they're likely to be a few years from now.

That's why the HP-86 has to be your best choice. It's got the software and the hardware to go the distance.

## Software for today and tomorrow.

Save \$255\* on the Personal Productivity Pac. Here's a good way to get started. With software that, if bought separately, would cost you \$750\*\* We're offering it at the reduced price of \$495\*\* You'll get VisiCalc® PLUS, the world-famous electronic spreadsheet for "what-if" planning. (The "PLUS" is a Hewlett-Packard bonus: extra programs to quickly turn your spreadsheet into bar graphs, line graphs, or pie charts.) Plus WORD/80, for word processing. And FILE/80, for record keeping without paperwork. CP/M®. Buy this plug-in module, and you'll extend your HP-86 system to accept many popular programs written under the CP/M operating system — programs such as WordStar™ and dBASE II.™

**Graphics Presentations.** When combined with the HP 7470A plotter, our graphics software lets you produce professional-quality pie and bar charts, line graphs, text pages, and overhead transparencies. And you can do it all in color.

**Data Communications.** If you decide you want it, an optional accessory lets you access The Source, the



**The HP-86**  
Personal Computer.

Dow Jones/News Retrieval Service, or a number of other nationwide information sources.

When the time comes for more, consult our 450-page software catalog. Chances are, you'll find what you're looking for.

## Hardware that expands with your needs.

While your computer's ability to expand depends largely on software, naturally, the hardware must keep up. That's why the HP-86 system has a modular design. So you can add a printer or plotter as easily as you hook up a tape deck to your stereo. And operate up to 14 peripherals at once, if you wish.

When you find yourself facing lengthy problems or spreadsheet analyses, simply add more memory — up to 640K bytes.

As you demand more of your HP-86, you'll find that it keeps up. Whether you need a broad range of hardware, software, or peripherals, the HP-86 makes expansion easy, giving you a hard-working system tailored to help solve your specific problems.

If you need more good news, try this: The basic system is only \$2820\*\* (128K computer/keyboard, 12" monitor and single 3½" disc drive).

Get a hands-on demonstration of the system that works for you now, and will still be working for you later.

For the authorized HP dealer or HP sales office nearest you, call TOLL-FREE 800-547-3400 and ask for operator 98. M-F, 6 a.m.-6 p.m. PST.

\*Software savings are based on suggested U.S. list prices and may vary.  
\*\*Suggested retail price. May vary outside U.S.  
VisiCalc is a registered trademark of VisiCorp.  
CP/M is a registered trademark of Digital Research, Inc.  
WordStar is a registered trademark of MicroPro.  
dBASE II is a registered trademark of Ashton-Tate.

PG02320 2 10B

**Personal computers & calculators  
for professionals on the move.**



**HEWLETT  
PACKARD**

CIRCLE 186 ON READER SERVICE CARD

# How to quickly re

If you'd like to turn the agony of small business bookkeeping into the ecstasy of total control, you've come to the right place.

Because even if you're starting with a shoe box full of invoices or a pile of checks hiding under a pile of deposit slips, we can tell you how to centralize, organize and monitor all that information, and manipulate it in ways that will make your business a

pleasure—all with an Apple® III Personal Computer.

## Attain instant financial status.

An Apple III, teamed with the BPI General Accounting Package, can put every basic accounting function right at your fingertips.

Technically,  
that means

General Ledger, Accounts Payable, Accounts Receivable and Payroll—all in one package.

Meaningfully, that means you can turn numbers into answers.

With BPI, your Apple III can give you a snapshot of your company's financial condition, an up-to-the-instant balance sheet. It

can also generate instant and detailed reports



# gain your balance.

on your customers and vendors.

So you know who owes whom, how much, and how come.

And just how well your cash flow is flowing.

And where to give credit where credit is due (a customer inquiry

The BPI General Accounting Package also lets your income statements be coded by location, department or product line. So you know where your money's coming from.

And where it's not.

results will make an important statement to everyone you deal with—including your banker.

## More ways Apples pay.

There are more people in more places doing more things with

Ichiban Fish Supply Company Consolidated Income Statement Current Comparative Periods Ending May 31, 1983 and May 31, 1982					
	May 31, 1983	%	May 31, 1982	%	
Income					
Contract Sales	52,818.82	91.3	44,176.52	92.7	
Retail Sales	5,816.88	8.7	3,588.88	7.3	
Total Income	57,634.98	100.0	47,765.42	100.0	
Cost of Sales					
Cost of Contract Sales	37,338.88	64.6	31,886.55	66.7	
Cost of Retail Sales	4,875.85	8.4	3,489.35	7.2	
Total Cost of Sales	42,284.73	73.0	35,375.90	73.9	
Gross Profit	15,625.85	27.0	12,468.62	26.1	

Your Apple can generate instant income statements (with expense ratios) or balance sheets, and let you compare them to last month's or year's, then print them out to suit your banker.

feature allows you to make credit decisions based on the most current information).

You can also list your purchases by discount dates. And take advantage of them in no uncertain net terms. You can even keep payroll records without paying more, because it's part of the same package.

## Profit from history.

In business as in life, experience is the best teacher. And the Apple/BPI system can provide you with instant comparisons of this-month-this-year vs. this-month-last-year, or this-year-to-date vs. last-year-to-date.

So you can quickly spot changing expense ratios and make decisions with 20/20 foresight.

Ichiban Fish Supply Company Merchandise Purchased By Due Date As of 05/31/83					
Date	Vendor No.	Invoice Number	Acct. No.	Detail	Net Amt
05/02/83	1	Herring World	35278532	5010-01	581.23
		Due: 06/03/83			
05/05/83	2	Consolidated Cod	4562	5010-01	289.36
		Due: 06/05/83			
05/05/83	3	Levy Sushi Farm	212	5010-01	459.88
		Due: 06/05/83			
05/05/83	4	Muskegon Men, Inc.	657	5010-01	68.26
		Due: 06/05/83			
Total					1,227.85

It can also allow you to take full advantage of merchandise discounts. So you'll know whom to pay when to pay, how much to pay—and save a lot of clams in the process.

## Make a timely statement.

Add an Apple Dot Matrix or Daisywheel printer to your Apple III, and you can print out your entire balance sheet in minutes.

Or any number of reports, from cash receipts to payroll ledger to income. You can even print checks and customer statements.

The impressively professional

Ichiban Fish Supply Company Accounts Receivable Ledger As of 05/31/83					
Customer No.	Folio	Balance Forward	Current Month	Balance	
1 Moser's Sole Food		892.79			
Invoice 1124	10		212.36		
Invoice 1125	10		156.88		
Invoice 1326	10		523.55		
05/15/83	CR		258.88		
				1,631.58	

To avoid fishy transactions, you can instantly display customer's payments, charges and current balance. In this case, a few more cans of tuna would put Mr. Moser over his \$2,000 limit.

Apples than with any other personal computer in the world.

Because for one thing, there's more software for Apples than for any other personal computer in the world. So the same Apple that handles all your accounting needs can also handle financial spreadsheets, word processing and electronic filing.

You'll also find programs that are designed specifically for your kind of business. Be it dentistry, architecture or swine herding.

Of course, the best way to learn all the ways Apples can help you make better business decisions is to visit any one of over 1500 authorized Apple dealers.

So drop in. For a full account.



The most personal computer.



Call (800) 538-9696 for the location of the authorized Apple dealer nearest you, or for information regarding our National Account Program. Or write Apple Computer Inc., Advertising Department, 20525 Mariani Avenue, Cupertino, CA 95014. © 1983 Apple Computer Inc.

CIRCLE 109 ON READER SERVICE CARD



# Plug 3,000 new applications into your Apple.®

**THE CP/M Card™ plugs CP/M Plus™ into your Apple.**  
The CP/M Card gives you the option of running your Apple II with the speed and capability of a professional Z-80 system with CP/M®-compatible software. You plug in the CP/M Card. Then choose CP/M or your standard Apple software at your option.

**Plug into a big, new world of software.**  
The CP/M Card gives you instant access to the world's largest selection of microcomputer software—more than 3,000 CP/M-compatible applications, languages, and programming utilities. So, you, too can use professional business programs such as WordStar®, SuperCalc™, Condor™, and other high-performance software from Day One. Yet, you still have access to your present library of Apple software.

**Plug into incredible performance.**  
Together, the ultra-fast CP/M Card and CP/M Plus run applications up to

300% faster than your Apple system! The CP/M Card is the only Apple II performance package that offers the speed and efficiency of CP/M Plus.

## **A plug about quality.**

The CP/M Card was designed and built by Digital Research, the creators of CP/M, and Advanced Logic Systems, the most respected manufacturer of Apple performance products. So you know the CP/M Card is the most perfectly integrated Apple performance package you can buy.

Why just keep plugging along? The CP/M Card provides everything you need—including 64K of on-board memory, CP/M Plus, CBASIC®, GSX™-80 and full documentation—for just \$399.

Now available through the CP/M library. See your local microcomputer dealer today. Or contact Advanced Logic Systems, 1195 East Arques Ave., Sunnyvale, CA 94086 (800) 538-8177. (In California (408) 730-0306.)



**Advanced Logic Systems**  
**The CP/M Card for your Apple II.**

Also available for the Apple IIe.

CP/M, CP/M Plus, the CP/M Card and CBASIC are either trademarks or registered trademarks of Digital Research Inc. Z-80 is a registered trademark of Zilog, Inc. WordStar is a registered trademark of MicroPro International Corporation. SuperCalc is a trademark of Sorcim Corporation. Condor is a trademark of Condor Computer Corporation. GSX-80 is a trademark of Graphics Software System. Apple is a registered trademark of Apple Computer, Inc. ©1982 Digital Research Inc.

**CIRCLE 105 ON READER SERVICE CARD**

# Mattel Aquarius Home Computer System

**Owen Linzmayer  
and David Ahl**

Until recently, the name Mattel was associated mainly with children's toys, most notably, the Barbie doll and Hot Wheels. That was before the company decided to take a chance by trying to establish a foothold in the blossoming business of selling home video game systems. If we look at the unquestionable success of the Intellivision, it is apparent that the executives at Mattel made a wise decision.

Can Mattel break away from its toy-

## The Aquarius Computer System at a Glance

**Suggested List Price:** \$159.95

**Dimensions:** 13.5" x 6" x 2"

**RAM:** 4K, expandable to 52K

**ROM:** 8K

**CPU:** Z80A

**Language:** Microsoft Basic

**Keyboard:** 49 keys with shift and control keys

**Video Output:** 40 x 24 character display  
80 x 72 pixel resolution  
16 colors

oriented background? That is the question as Mattel now enters the already crowded home computer market with the Aquarius.

The Aquarius computer console retails for \$100-\$160, depending upon where you buy it. What exactly do you get for your money? The low-end, no frills Aquarius system features a rubber "Chiclet" keyboard, 4K RAM, a Z80A microprocessor, and a version of Microsoft Basic residing in ROM. You also receive a 10' video cable, TV switch box, power adapter, and two instruction manuals.

Let's take a closer look at the Aquarius and the peripherals available at the time of this writing.



## Aquarius, continued...

### Console

The base of the computer measures 13.5" x 6" and is molded in a combination of black and off-white plastic. The back of the console is 2" high but slopes down to a sleek 1" at the front. The on/off switch is mounted on the righthand side of the computer, and a green LED located on the face indicates when power is flowing.

The Aquarius has a single edge-connector in the rear that allows the user to plug in either program cartridges or accessories such as the Mini Expander module. When the slot is not in use, a dust cover keeps the contacts clean.

The video-out connector is also found on the back, along with the TV channel selector (3 or 4). Situated next to this switch are the cassette and printer I/O ports. The power adapter cable enters the computer at the rear where it is permanently attached.

### Keyboard

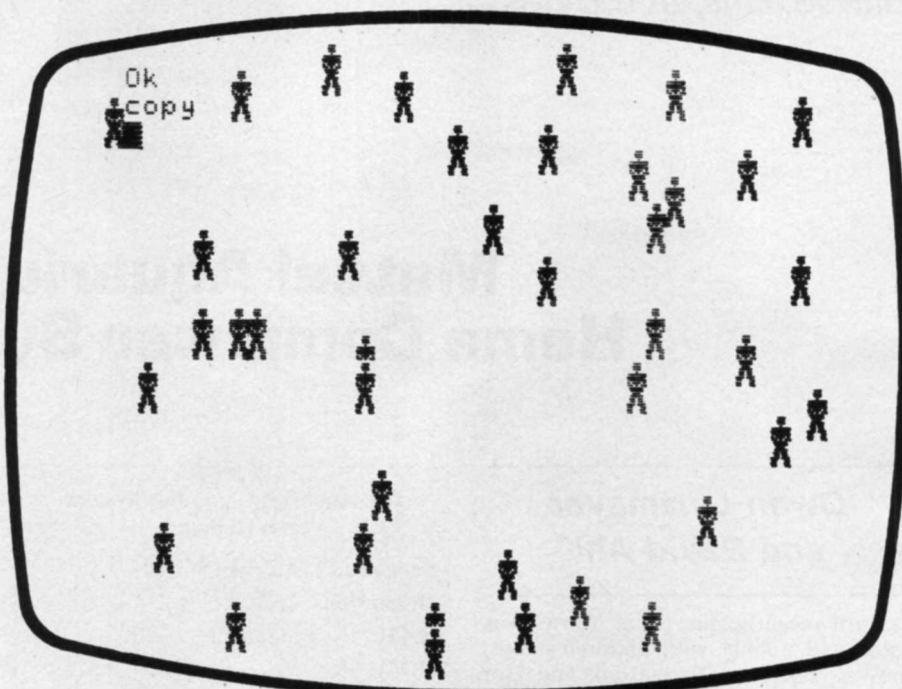
The Aquarius keyboard is a compromise between full-stroke and membrane—what we refer to as "Chiclet" style. Unlike a flat membrane keyboard, each key on the Aquarius protrudes above the surface of the computer. To the delight of smaller children, and to the disappointment of touch typists, the 49 light blue rubber keys are spaced rather close together. There is a slot on each side of the keyboard so that overlays may be inserted easily.

## The current version of Microsoft Basic on the Aquarius leaves much to be desired.

Most of the keys have both lowercase (normal) and uppercase (shift) characters. In addition, the control key provides 34 special keyword abbreviations. This is quite handy because the Aquarius is somewhat prone to key bounce (one press of a key is interpreted by the computer as two or three keystrokes).

Touch typists will find it particularly difficult to adjust to the Aquarius keyboard, mainly because of the positioning of the spacebar. Instead of its customary location, centered on the bottom row, the spacebar is found in the lower left-hand corner of the keyboard. What's more, it isn't even a spacebar. It is a small key. Granted, the space"bar" is larger than most of the other keys, but no bigger than the shift and return keys.

A better bit of keyboard design is seen



Screen output for Program 1 as printed on the Aquarius printer.

in the reset key, which is surrounded by raised edges that prevent accidental pressing. If you hit the reset key by mistake, you can sometimes save your program by pressing CTL-C. The manual claims that CTL-C will always enable you to recover a program after pressing reset. Not so; it rarely works when programs use POKE statements.

### Basic Language

The Aquarius comes with a version of Microsoft Basic residing in the 8K ROM. This version has somewhat fewer commands than some other implementations (see Table 1). Mattel plans to offer an Extended Basic upgrade later this year. This is similar to what Radio Shack did with their Color Computer.

The current version of Microsoft Basic on the Aquarius leaves much to be desired by the serious programmer. Probably the biggest inconvenience is that the editing features are extremely

```
290 PRINTCHR$(11)
300 H=12328
310 A=H+900*RND(1)
320 POKE A,19
330 POKE A+40,20
340 Z=Z+1
350 IF Z<40 THEN 310
360 END
```

*Program 1. This short produces 40 little men, each consisting of two graphics characters (characters 19 and 20) that are POKED into graphics screen locations in lines 320 and 330.*

limited. If you find a mistake in your program, you must retype the entire line that contains the error.

### Screen Output

The Aquarius features an upper- and lowercase text display of 40 x 24 black characters on a blue field. With a one line command, the background and foreground colors can be selected from a pal-

Table 1.

ABS	DIM	LEFT\$	ON	RETURN	STOP
AND	END	LEN	OR	RESTORE	STR\$
ASC	EXP	LET	PEEK	RIGHT\$	TAB
CHR\$	FOR	LIST	POINT	RND	TAN
CLEAR	FRE	LLIST	POKE	RUN	THEN
CLOAD	GOSUB	LOG	POS	SGN	TO
CONT	GOTO	LPRINT	PRESET	SIN	USR
COPY	IF	MID\$	PRINT	SOUND	VAL
COS	INKEY\$	NEW	PSET	SPC	
CSAVE	INPUT	NEXT	READ	SQR	
DATA	INT	NOT	REM	STEP	

# This One Decision Saved our Business and Grossed over \$1,000,000. in Sales

In 1979, our recreational manufacturing business was booming. And we had developed a new product that looked like a real winner. The new product was extremely important, in that it appeared to be the answer to a seasonality problem associated with our other product lines.

By early summer, our order book was bulging. It really looked as if our off-season sales and production problems were over. Then just as quickly the roof fell in. Gas shortages devastated the recreational vehicle market overnight. And our order book for over two million dollars worth of the new product disintegrated. Faced with a fall and winter of virtually no sales, many thousands of dollars of unneeded parts and excess production staff, I had no choice but to shut down the production lines. And if a solution to our problem could not be found, the business itself was in jeopardy.

## A life saving decision

I spent many sleepless nights trying to come up with a solution to this nightmarish situation. Then I remembered a course I had taken in decision analysis. I spent the rest of that night reviewing course material and other books I had bought on the subject. The next day, I called an emergency meeting. Using the decision making techniques I had learned, we spent the rest of the week searching for and analysing potential solutions. The net result was that not only was the company pulled back from the brink of destruction, but we added over \$1,000,000.00 in gross sales during that off-season.

## A way of life

From that point on, almost every critical decision (and there were many) regarding new products, marketing channels, pricing, advertising, production equipment, engineering projects, received this same type of analysis.

Although the process was very time consuming and clumsy, because it had to be done by hand, our decisions were much improved. And there were some real benefits that we had not anticipated.

1. Our understanding of each problem was greatly increased.
2. We uncovered opportunities that we would not have thought of in any other way.
3. Our decisions were documented, preventing us from slipping off the selected path or 'rehashing' the same things over and over.
4. Consensus became easier because we were forced to focus and resolve each part of the problem, one piece at a time.

## The birth of Decision~Analyst™

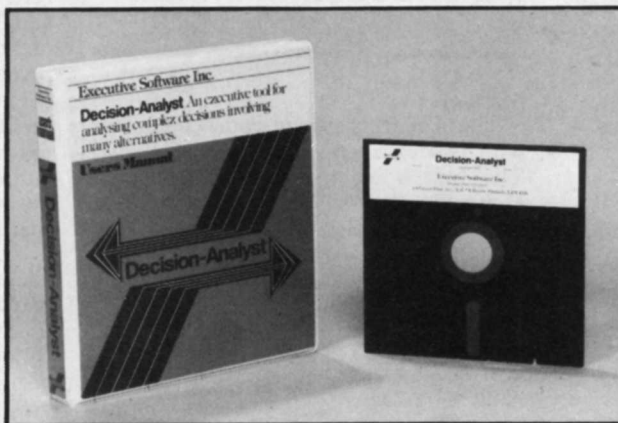
Decision~Analyst was created because the process of evaluating complex decisions with multiple alternatives and many criteria is very tedious and time-consuming if you do it on paper. And doing it in your head is virtually impossible.

Any complex decision usually requires multiple revisions to criteria, alternatives, weights and values assigned to them. If done manually, the ordeal of rewriting, recalculating and redocumenting tends to discourage revisions, thus producing poor results.

Decision~Analyst overcomes these problems by asking for the minimum input possible from you, in the correct sequence. It leads you step by step through the decision making process, then does all the necessary calculations and produces polished reports without any further effort. And all of your input is stored on your disk so that revisions and updates can be made easily at any time.

## Comprehensive but easy to use

Decision~Analyst is probably the easiest program you'll ever use. You can literally learn to operate the program using only the 'help' screens. But it comes with a thoroughly indexed manual which includes many pages of examples plus a step by step guide to the decision making process.



And Decision~Analyst is no fly-weight. It uses over 100,000 bytes of fast compiled code and a 40,000 character help file. The program is extremely 'bullet proof' and does all the work... you do the thinking. And there is no danger of missing a critical step because your analysis is guided through each of the eight menu-driven sections.

## Endless opportunity for use

If you're saying to yourself that you really don't have any earth shattering applications for Decision~Analyst... then consider this.

If you're in business, chances are that the most important thing you do is make decisions.

Decision~Analyst can help you select key personnel, decide on new machinery or equipment, prioritize major projects and allocate resources, choose a new product or a better price strategy, select new offices or plant locations, select the most profitable marketing channel or the best piece of computer hardware or software. Use it to analyse any decision which has more than one viable alternative.

In your personal life, it can help you choose the best job, select the right business, career or franchise, determine the best field of investment or even the right home, boat or car. In fact, improving your decisions is probably the most rewarding thing you can do.

## Let us help you make a \$139<sup>00</sup> decision

If there's a chance that Decision~Analyst could help you improve even one decision, would it pay for itself? Chances are it would. In fact, it's likely that it could save you the price many times over!

So why not take advantage of this special \$139.00 introductory price (plus \$5.00 shipping) by calling us today? We'll even refund your money, within 30 days, if you're not completely satisfied.

Decision~Analyst requires a CP/M or MS-DOS operating system, 52K of RAM, a 24 x 80 column screen and an 80 column printer for your reports. Order by calling collect to...

## Executive Software Inc.

705-722-3373

Two North State Street, Dover, Delaware 19901

ad # 1016

DAS

\* CP/M is a registered trademark of Digital Research Inc. \* MS-DOS is a registered trademark of Microsoft Corp. \* Decision~Analyst is a trademark of Executive Software Inc. \* Copyrighted 1983 by Executive Software Inc.

CIRCLE 143 ON READER SERVICE CARD

## Aquarius, continued...

ette of 16 colors. Unfortunately, there is no Color command; to color a block, the command is POKE (L,C). L refers to the screen location (13352 to 14311) and C to the color (0 to 15).

Low-resolution graphics characters may also be manipulated within the 40 × 24 screen grid using POKE commands. Fortunately, the character set contains a substantial number of graphics characters (160) in addition to the standard 96 ASCII characters (letters, numbers, symbols). Thus it is possible to achieve reasonable animation on the low-resolution screen.

With the present Basic, the highest graphics resolution available to the user is 80 × 72 pixels. This is achieved by dividing each block on the 40 × 24 grid into six pixels. Unlike the background, you cannot designate the color of a pixel; each pixel within a block of six is the

same, although blocks may be individually colored. In this mode, the available commands are PSET(X,Y) to turn on a pixel, PRESET(X,Y) to turn it off, and POINT(X,Y) to determine if it is on or off.

Unfortunately, the Aquarius does not have a clear screen (CLS) command. Instead, you must type PRINT CHR\$(11). This is cumbersome, particularly since graphics characters do not automatically scroll off the screen when a listing is done.

## The Aquarius system comes complete with two excellent instruction manuals.

### Manuals

The Aquarius system comes complete with two excellent instruction manuals. The first booklet, entitled "Guide to Home Computing," gives detailed, illustrated directions on how to set up the computer. There are 11 chapters dedicated to introducing the beginner, as well as the more advanced programmer, to the Basic language and the particular features of the Aquarius. This manual is well written and explains each function in simple terms. To aid the learning process, hints, programming tips and examples are abundant. The omission of an index is the only disappointment in an otherwise excellent manual.

The second booklet is really a set of 16 "Simplified Instruction Cards." These pop up and are intended to sit next to your computer for quick and easy reference. If neither manual solves a specific problem, toll-free phone numbers are provided for service information and programming assistance. This is a luxury and is tremendously useful. Unlike the "help" lines of many other computer companies, these two are manned by a staff of knowledgeable and courteous people.

### Printer

One of the most useful peripherals for a computer system is a printer. Whether it be for word processing or getting a hard copy of a program listing, a printer is an invaluable tool. The Aquarius printer is just like its computer counterpart: small and simple.

Two blue buttons and a green LED are all that is found on the front panel of the printer. The rightmost button is the power switch, and when the electricity is on, the LED lights up. Depressing the

button on the left causes the paper to advance little by little.

The printer requires its own power source. It uses a unique serial interface; a

### The Aquarius Printer at a Glance

**Price:** \$165

**Dimensions:** 7.5" x 8.5" x 3"

**Speed:** 80 cps alphanumeric,  
upper/lowercase

20 graphic lines per second

**Printhead:** 5 x 7 thermal dot matrix

**Truckwidth:** 40 characters per line

connecting cord is provided. The printer manual claims that the Aquarius thermal printer has an alphanumeric print rate of 80 characters per second (cps) and a graphics print rate of "20 elementary lines per second." I did some of my own testing and found these numbers to be relatively accurate. The thermal printhead consists of a 5 × 7 dot matrix which prints blue characters on white 4 3/8" wide paper. The printer can output 40 characters per line, making it fine for listing a program, but a bit unorthodox for serious word processing. The printable characters include upper- and lowercase, as well as special character graphics. On the back of the printer is a three-position sliding switch that designates which mode the printer is in: graphics, mixed, or text.

## Like most thermal printers, the Aquarius model is fairly quiet.

Like most thermal printers, the Aquarius model is fairly quiet. In fact, most of the noise it produces seems to be caused by the friction feed paper advance system, not the process of printing. When the printer is waiting for input, it is absolutely silent.

The Aquarius printer comes with a small booklet that is in no way a technical manual. Also included with the printer are two rolls of thermal paper—one already installed. By the way, installing the paper in the printer is no easy task. After a bit of practice it does become easier, but it is still something I don't look forward to doing.

### Mini Expander

The Aquarius computer comes with only one cartridge slot. The Mini Expander module has slots for both memory

```
10 PRINT CHR$(11)
20 C=INT(16*RND(1))
30 I=INT(11*RND(1))
40 P1=13352+40*I+I
50 P2=P1+40-2*I
60 P3=14272-40*I+I
70 P4=P3+40-2*I
80 FOR P=P1 TO P2
90 POKE P,C
100 NEXT P
110 FOR P=P2 TO P4 STEP 40
120 POKE P,C
130 NEXT P
140 FOR P=P4 TO P3 STEP -1
150 POKE P,C
160 NEXT P
170 FOR P=P3 TO P1 STEP -40
180 POKE P,C
190 NEXT P
200 N=N+1
210 IF N<20 THEN 20
220 END
```

*Program 2. This program produces 20 colored concentric rectangles using low-resolution graphics characters. Points P1 through P4 define the four corners of each rectangle.*

```
10 PRINTCHR$(11)
20 I=INT(35*RND(1))
30 X2=79-I
40 Y2=71-I
50 FOR X=I TO X2
60 PSET(X,I)
70 PSET(X,Y2)
80 IF X2-X<=8 THEN 130
90 PSET(I,X)
100 PSET(X2,X)
110 NEXT X
120 C=C+1
130 IF C<20 THEN 30
140 END
```

*Program 3. This program also produces 20 concentric rectangles using high-resolution pixels. Note the ease of using PSET command compared to the POKES in Program 2.*

# OF ALL THE THINGS YOU BUY, HOW MANY ARE GOOD ENOUGH TO BE WARRANTED 5 YEARS?

Few disks stand the test of time. Because few are built to the precision standards or certified to the critical levels of Omni's complete line.

Each Omni disk is rated for 12 million passes without disk-related errors or significant wear. Each is certified error-free at a minimum of twice the error-

threshold of your system. And built to exceed all industry specifications including those of ANSI, ECMA, ISO and virtually every drive manufacturer. So you can count on them for the long haul. We guarantee it.

Call toll-free (800 343-7620) for your nearest dealer. In Mass., call 617 799-0197.

Omni Resources, 4 Oak Pond Ave.,  
Millbury, Mass. 01527

**Dealers. Software houses.** Check our prices, services and specifications. We offer **duplicating, formatting, private labeling, small minimums, fast delivery and copy protection schemes on disks for virtually any system.**



## OMNI

### THE DISK GOOD ENOUGH TO BE WARRANTED 5 YEARS

CIRCLE 271 ON READER SERVICE CARD

# Put your Micro on IBM's level

Now you can communicate with the IBM world with Innovative Data Technology's 1/2" magnetic tape peripherals.

Popular configurations and optimum performance for most small systems that feature industry-standard interfaces, rapid data transfer rates, full operating and command subsets and a wide selection of models and configurations, IDT's magnetic tape subsystems provide economical and reliable data/program interchange, 40M bytes of storage and disc back-up. All IDT subsystems come complete and include tape transport, formatter, intelligent controller, computer resident coupler, cables, documentation and software. But most importantly, they help put your system in touch with the IBM universe.



O.E.M., dealer/distributor discounts available.



4060 Morena Blvd. • San Diego, CA 92117  
(619) 270-3990 • TWX: (910) 335-1610  
**Eastern Regional Office:**  
P.O. Box 1093 • McLean, VA 22101-1093  
(703) 821-1101 • TWX: (710) 833-9888

IBM is a trademark of International Business Machines Corp.  
Apple is a trademark of Apple Computer Inc.  
TRS-80 is a trademark of the Tandy Corporation.

CIRCLE 196 ON READER SERVICE CARD

## Learn Successful Computerized Investing To Make Money In Any Stock Market & Gain Financial Freedom

If you want to increase your personal wealth while beating any stock market in the world at its own game, then the Wall Street TAP System with its outstanding programs merit your immediate and serious attention.

Stockline and Stock Stalker are finally available to help you build lifelong financial independence for yourself by unlocking the basic secrets of how to succeed in any American, Canadian or international stock market. Now, more and more market professionals who use technical analysis, are switching to this kind of software.

These two superior packages systematically compute stock and market data into graphic charts, displays and printouts that allow you to quickly evaluate

the quality, value and trend of any target stock moving in any market.

Both Stockline and Stock Stalker use the same reliable and proven appraisal techniques perfected by seasoned stock market specialists to pick their stocks. Offering unparalleled value-per-dollar features and simplicity of operation, they are designed exclusively for the home computer owner who seeks new, exciting ways to employ his hardware.

Easy to use, each program is self-documented, menu-driven, help desk supported, user-friendly, self-prompting with error trapping entry and batch updating. The accompanying operations manual is extensive, understandable and

comes complete with hardcopy samples.

Configuration: Apple II with Applesoft ROM or Apple II Plus. TRS-80 Model I or III 48K, 1 disk drive.

**Valuable Bonus Extra With Stockline & Stock Stalker Orders!**

When you order Stockline or Stock Stalker you'll receive, FREE, a 6-month subscription to **Computer Investing News**. It's the up-to-the-minute newsletter that opens vaults of information on how to maximize your gains through computerized technical analysis investment software. **Think Software Inc.**, 572-810 West Broadway, Vancouver, B.C. Canada V5Z 4C9 (604) 261-7261 CompuServe 72165.37

### Choose The Stock Appraisal Software That Turns Stock Market Investing Into Computer Play

The Wall Street TAP System From Think Software Inc.

☐ **Stockline The Advanced Stock Appraiser** US \$149.95. Stockline uses classic performance factors; from moving average, through point and figure, to on balance volume. With its many value-rated features such as the stock split adjustment subsystem and simultaneous chart comparison capabilities, you will have an efficient personal stock consultant at your command.

☐ **Stockline With Wall Street TAP Communications Package** US \$199.95. Save \$10.

☐ **Stockline Operations Manual by Itself** US \$29.95.

☐ **Stock Stalker The Basic Stock Appraiser** US \$49.95. A beginner's package that is

simply revealing in its ability to spot trends, relative strengths and confirmation patterns based on price and volume data. Chart comparison system built-in. Documentation is not sold separately.

☐ **Wall Street TAP Communications Package** US \$59.95. Tap into the CompuServe database with Stockline and Stock Stalker. Apple requires D.C. Hayes Micromodem.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State/Zip \_\_\_\_\_  
\$ \_\_\_\_\_ enclosed plus \$2.00 postage & handling. Add 6% tax if delivered in B.C.  
☐ Check ☐ Money Order ☐ Visa ☐ MasterCard  
Card No. \_\_\_\_\_ Expiry \_\_\_\_\_  
Signature \_\_\_\_\_

572-810 W. Broadway, Vancouver, B.C. Canada  
V5Z 4C9 (604) 261-7261 CompuServe 72165.37

### Order By Phone 24 Hours Daily.

Call (604) 261-7261. Please have your charge card handy.

**Order By Mail.** Complete coupon and mail to Think Software Inc., 572-810 W. Broadway, Vancouver, B.C. Canada V5Z 4C9.

Yes. Send me rush the stock appraisal package(s) that I've checked. I want to start making money in the stock market immediately with my ☐ Apple ☐ TRS-80.

**Think Software Inc.** C5  
Dealer Inquiries Welcome.

CIRCLE 279 ON READER SERVICE CARD

## Aquarius, continued...

and program cartridges, two hand controllers, and two additional sound channels.

Designed in a fashion that is consistent with the computer console, the Mini Expander plugs into the cartridge slot and measures 4.5" x 5.5" when installed.

With the Expander, a memory upgrade cartridge can be inserted into the rear slot at the same time that a program cartridge sits in the front slot. I haven't seen it yet, but I assume that the 32K memory cartridge is used in conjunction with the 16K cartridge to provide the system maximum of 52K of RAM.

Mattel advertises each controller as having a 16-position disc, not joystick. This is true—and unfortunate. While those who are accustomed to the Intellivision may not mind the disc, I would much rather have a real joystick. Luckily you have two choices to improve the comfort of the controller: Buy either an Injoy-A-Stick adapter or a set of Thumb Saver cushion pads.

Each controller is detachable and accepts keypad overlays. The keypad consists of six rubber buttons. Why Mattel

### The Aquarius Mini Expander at a Glance

**Price:** \$60

**Dimensions:** 4.5" x 5.5" x 2"

**Features:** 2 program/memory cartridge slots,  
2 additional sound channels  
2 16-position hand controllers with 6 buttons

didn't make the Aquarius controllers compatible with the new Intellivision II controllers is beyond me.

The response of the controller is very good once handling it is mastered. The cable connecting it to the Expander is a lengthy coil similar to those found on telephone handsets. Although the controllers work well with preprogrammed games, they cannot be accessed by the user from Basic. This is a major drawback for anyone who is interested in using the Aquarius to design game software. A representative at Mattel hinted that the Extended Basic may contain commands to allow the use of the controllers. One can only hope so.

### Memory Expansion

As stated earlier, the minimum configuration Aquarius comes with 4K of user RAM. Additional 4K and 16K memory cartridges are now available. These augment the memory that is already permanently installed in the computer. A 32K upgrade is scheduled for release later this year.

CIRCLE 402 ON READER SERVICE CARD

How many companies offer  
toll free **TOTAL SUPPORT** on  
all hardware & software?

There is only one number to call:

# 1-800-237-8977

In Florida call 1-813-786-1259

Business Applications Software with  
**TOTAL SUPPORT**...specializing in:  
**IBM<sup>TM</sup>, APPLE<sup>TM</sup>, TRS-80<sup>TM</sup> and XEROX<sup>TM</sup>**

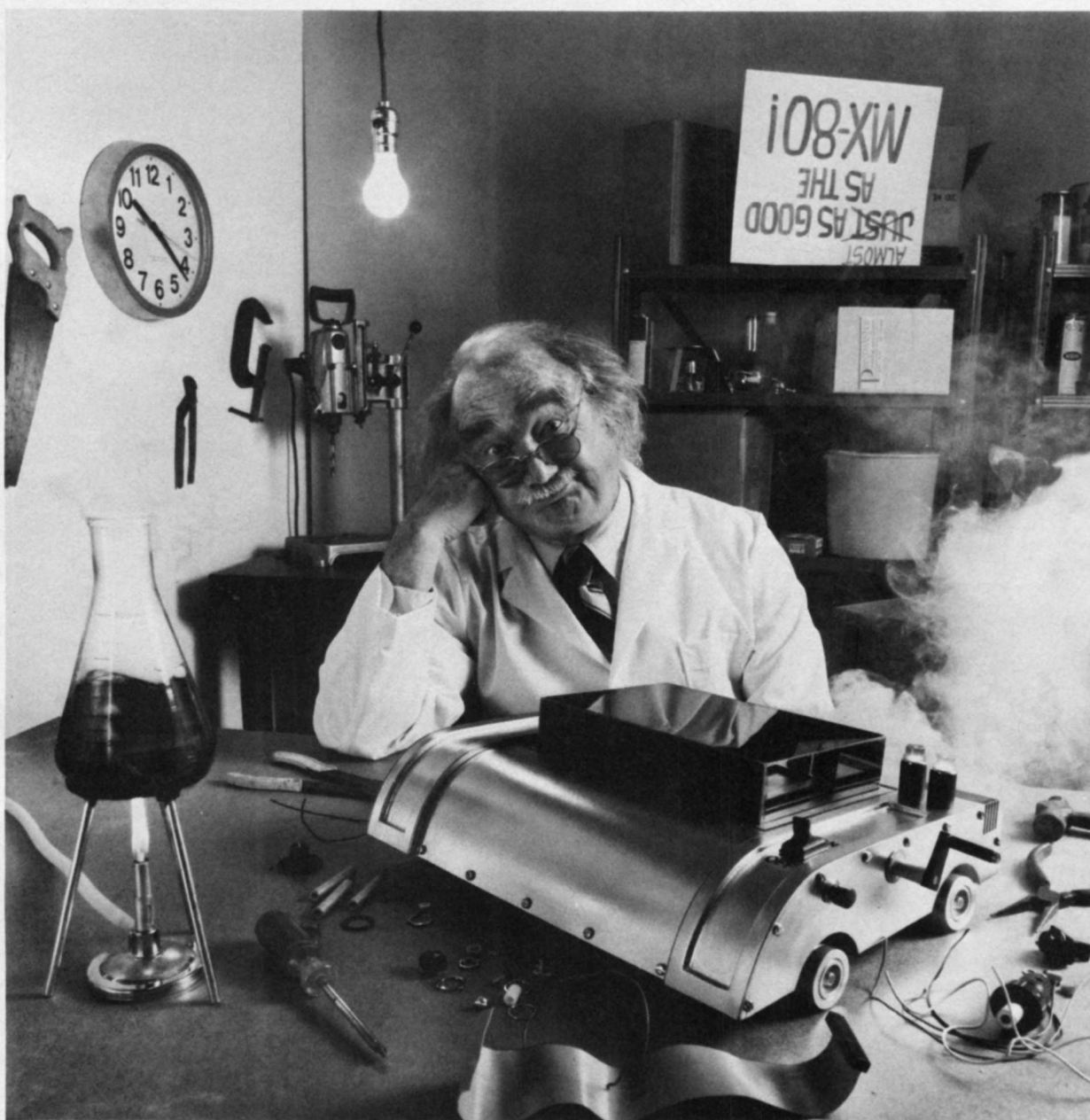
# The Systems Group

2340 State Route 580/Suite 234  
Clearwater, Florida 33575  
Telex 701484

There is only one catalog to have:  
our new, **free** 100 pages of the  
best in hardware and software.  
Send for your copy today!

IBM is a trademark of IBM Corporation  
APPLE is a trademark of Apple Computer Inc.  
TRS-80 is a trademark of The Radio Shack Division of Tandy Corporation  
XEROX is a trademark of Xerox Corporation

**CIRCLE 215 ON READER SERVICE CARD**



For everyone who's tried  
to top the MX-80, bad news.  
We just did.

Epson.

The Epson MX-80 is the best-selling dot matrix impact printer in the world. It has been since its introduction. And despite the host of imitators it spawned, no one has been able to top it. Until now.

#### **FX-80: Son of a legend.**

The new Epson FX-80 is far more than just doo-dads added on to last year's model. It's the most astonishing collection of features ever assembled in a personal printer.

For starters, it's fast: 160 CPS. And clean. All the print quality Epson is famous for in a tack-sharp 9x9 matrix.

But that hardly scratches the surface.

#### **Create your own alphabet.**

With the new FX-80, you aren't limited to ASCII characters. You can create your own. Any character or symbol that can be defined in a 9x11 matrix can be added to the FX-80's already impressive library of type styles and stored in its integral 2K RAM.

So you can create "Sally's Gothic" or "Tom's Roman" just by downloading and modifying standard characters. Or you can create a custom set from scratch. Either way, you can store up to 256 new characters. And if you don't need a new alphabet, the RAM functions as a 2K data input buffer.

#### **Who knows graphics better than Epson?**

Nobody, that's who. And if you don't believe it, witness the FX-80.

With a 12K ROM capacity, the FX-80 gives you a few things the others don't. For example, not one, not two, but *seven* different dot addressable graphic modes are program

selectable. And can be mixed in the same print line. Everything from 72 DPI (dots-per-inch) Plotter Graphics to the 640 dots per line resolution designed to match the remarkable monitor clarity of the Epson QX-10 personal computer.

And *that* is in addition to an astonishing array of 136 different user-selectable type styles including Proportional, Elite and Italic as well as the more conventional faces you get on other printers.

#### **Hard-to-beat hardware.**

The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

The FX-80 features an adjustable pin platen or optional friction/tractor feed, so you can use fanfold, roll or sheet paper ... backwards or forwards. The FX-80 even gives you reverse paper feed.

And if you're printing forms, the FX-80 has a feature you're gonna love: a function that allows you to tear off the paper within one inch of the last print position.

#### **Be the first on your block.**

We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

And while you're there ... ask them to show you how it works with our computers.

The New  
Epson FX-80.  
See it at your  
dealer now.



**EPSON**  
EPSON AMERICA, INC.  
COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street  
Torrance, California 90505  
(213) 539-9140.  
Outside California, phone  
(800) 421-5426 for the  
Epson dealer nearest you.

# Petite Electronic Talking Typewriter

After several scattered articles on consumer products built around microprocessors, it's time to get organized, and settle down to an irregular series on the subject.

The three previous articles are: "Heathkit/Thomas Electronic Organ Kit" (June 1980, p. 54), "Electronic Music in Small Packages" (September 1981, p. 294; about the Casiotone M10 keyboard instrument), and "The Great Awakening" (December 1981, p. 105; about the General Electric 7-4880 programmable digital clock radio).

There will be more like this one, but not every month, nor at any regular interval. One problem is that although many consumer products containing microprocessors are on the market, many manufacturers of such products don't want to reveal what goes on inside their widgets, not even as little as a block diagram, without which an article like this would be reduced to a long new product item.

The point of this series is to show what microprocessors can do other than serve as the basis for computers, and to give some idea of how the products operate other than on the overly simple basis of "press this button and that happens." And although a talking typewriter represents a relatively simple use of a microprocessor, it is one of many products that couldn't be manufactured today without inexpensive silicon chips.

## Petite Electronic Talking Typewriter

At first glance, the Petite Electronic Talking Typewriter looks very much like an ordinary children's typewriter with a blue plastic case and red plastic keys. But if you look closely, you'll see two

---

## Stephen B. Gray

---

special blue keys, FIG and LEVEL, and also a section to the right of the typewriter itself, with ON and OFF buttons, a battery compartment, and the words "Talking Typewriter" and "solid state."

Push the ON button, and after a short musical fanfare, a British-accented male voice says, "Hello, this is your Petite Talking Typewriter." Press any red key, and not only will the character be

printed on paper, the voice will say the name of the letter, from A through Z. Press the FIG key, and you can print the numbers 0 through 9, and characters such as \$ 1/4 1/2 &. But only the numbers will be spoken; the others produce a beep on the speaker.

That's only the beginning; the machine has a stored vocabulary for teaching children how to spell.

## Spelling Game

Press the LEVEL key, and the voice says, "Level One selected," pauses, then



Figure 1. The Petite Electronic Talking Typewriter is advertised as the world's first talking typewriter for children.

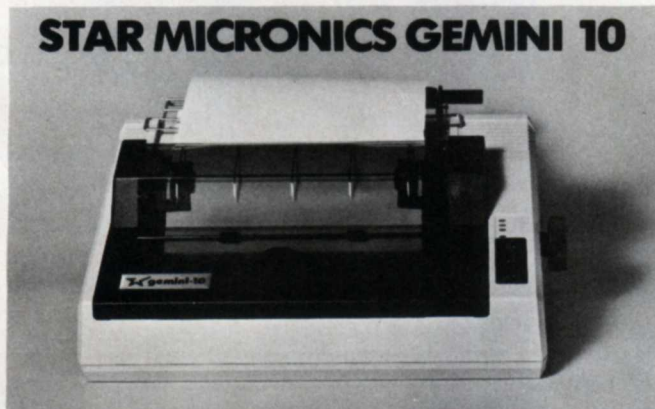
# OMEGA



INTERNATIONAL

## SAVE ON ... COMPUTERS • MONITORS PRINTERS • PERIPHERALS • SUPPLIES\*

### STAR MICRONICS GEMINI 10



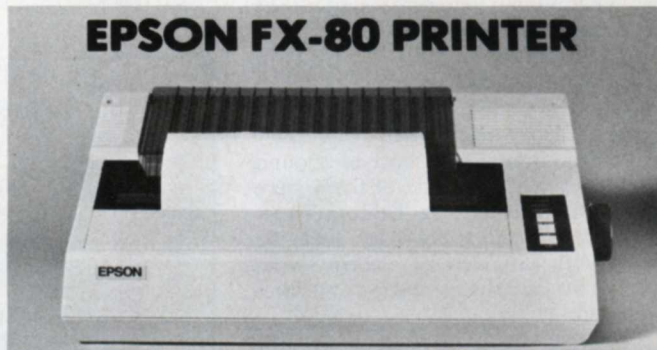
#### OMEGA SALE PRICED PRINTER

• DOT MATRIX

**\$329**

SALE ENDS 6/30/83

### EPSON FX-80 PRINTER



- Up To 160 cps • 11 x 9 Matrix • Pinfeed Platen
- Proportional Spacing • Graphics • Elite Pitch
- Centronics Parallel Interface • Internal 2K Ram

**NOW AVAILABLE FOR IMMEDIATE DELIVERY!**

For Our Price...CALL 1-800-343-0873 TODAY!

### SAVE ON LETTER QUALITY PRINTERS

DIABLO 620 New Low Price .....	929.00
DIABLO 630 w/API & cable .....	1,749.00
NEC 3510 SPINWRITER .....	1,399.00
NEC 7710 SPINWRITER .....	2,045.00
NEC 7730 SPINWRITER .....	2,095.00

### BIG SAVINGS ON ACCESSORIES

HAYES SMARTMODEM 300 Baud .....	230.00
HAYES MICROMODEM II (APPLE II) .....	289.00
MICROSOFT SOFTCARD PREMIUM SYSTEM .....	459.00
ORANGE MICRO GRAPPLER + .....	120.00
PKASO PRINTER CARDS .....	129.00
RANA ELITE I (APPLE II) .....	299.00
SIGNALMAN MODEMS (MK I) As Low As ..	85.00

### ACCESSORIES & SUPPLIES

OMEGA Has A Complete Line of Accessories & Supplies for the Apple II and many other Popular Computers by manufacturers like:

- D. C. Hayes • Microsoft • Tymac
- M & R Enterprises • Mountain Computers
- Kensington Microware • Practical Peripherals
- T.G. Products • Videx

### SOFTWARE

Omega Carries Software by the following companies:

- American Business Systems • Ashton Tate
- Dakin 5 • Innovative Software • Microsoft
- Sorcim • Stoneware • Visicorp

### DOT MATRIX PRINTER BARGAINS

C-ITOH PROWRITER 8510 AP .....	399.00
IDS MICROPRISM 480 .....	549.00
OKIDATA MICROLINE 92 (NEW) .....	549.00
OKIDATA MICROLINE 93 (NEW) .....	859.00

### MONITOR SPECIALS FROM OMEGA

AMDEK 300 G .....	139.00
AMDEK 300 A .....	165.00
NEC JB1260 .....	119.00
NEC JB1201 M .....	169.00
USI Pi-2 12" GREEN MONITOR .....	159.00
USI Pi-3 12" AMBER MONITOR .....	179.00

### MAGNETIC MEDIA

OMEGA Stocks Diskettes by:

- Dysan • Elephant • Maxell • Verbatim

- All Equipment Factory Fresh w/ MFT Warranty
- Prices Do Not Include Shipping Charges
- Mass. Residents Add 5% Sales Tax
- All Returns Subject To Restocking Fee

### CUSTOMER PICKUP NOW AVAILABLE

334 R Cambridge St., Burlington, Mass.  
(617) 229-6464



\* PRICES, SPECIFICATIONS AND AVAILABILITY OF ADVERTISED MERCHANDISE SUBJECT TO CHANGE WITHOUT NOTICE

UNADVERTISED SPECIALS ON • COMREX • EPSON • NEC • IDS PRISM • OKIDATA

# OMEGA INTERNATIONAL

334 R CAMBRIDGE STREET, BURLINGTON, MA. 01803

## Talking Typewriter, continued...

asks, "Can you spell CAT?" If you spell it correctly, key by key, the voice responds with "That is correct," and asks you to spell a second word.

If you spell CAT incorrectly, the voice says, "Wrong. Try again." You get

one more chance, and if you are wrong the second time, the voice says, "That is incorrect. The correct spelling of CAT is C...A...T." Then it gives you a second word to spell, such as *day*, *two*, or *milk*.

If you don't understand the word you

are supposed to spell, press the key to the left of the LEVEL key, and the word will be repeated.

Press the LEVEL key a second time, and the voice says "Level Two selected," and gives a longer word, such as *mother*,

The original Talking Typewriter was designed by Omar K. Moore while he taught at Yale University in the early '60's. My first contact with the device was when Omar joined the staff of the Learning R & D Center at the University of Pittsburgh in 1967.

By then, McGraw-Edison, to which Yale had assigned the patents of the Talking Typewriter, had built several dozen units at a cost of around \$35,000 each. Five or six of them were at Pitt. Outwardly, the Talking Typewriter resembled a language learning carrel with an oversize electric typewriter on a shelf and a speaker overhead.

The device was developed as part of a long-term research program in psychology, language, mathematics, and learning called "The Clarifying Environments Program." The principal purpose of the Talking Typewriter was to help children learn to communicate effectively. It focused on two important steps: learning to read and learning to write.

The device had many programmable modes of operation. Initially, when a child first used the machine, it simply voiced the letter of the key that was pressed. Next, it would say a letter and the child had to press that key; indeed, it was the only key that would respond. Later, the child moved to words, phrases, and sentences.

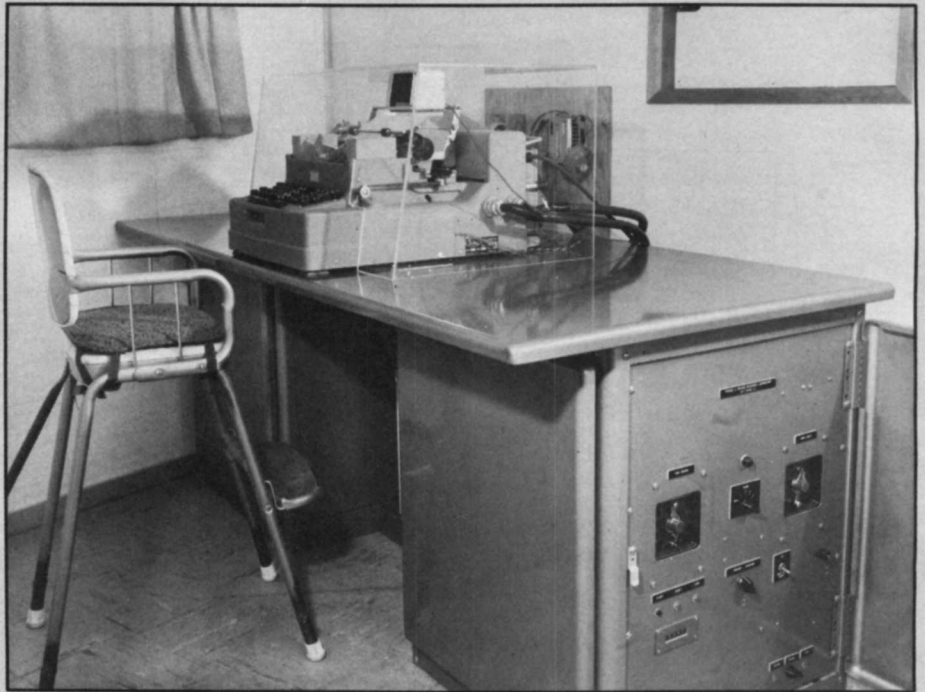
By the end of the second year of operation, the children using the Talking Typewriter had made enormous progress. They were even turning out their own "newspaper," weekly, as I recall. The three-year-olds gathered the news, the four-year-olds wrote the stories, and the five-year-olds were responsible for editing and layout. Astonishing! Imagine where these kids are today!

Because of its cost, the Talking Typewriter never gained wide acceptance in schools, and McGraw-Edison stopped making them. Although Omar is still a Professor of Sociology at Pitt, the Clarifying Environments Program has pushed into new areas focusing principally on disadvantaged children.

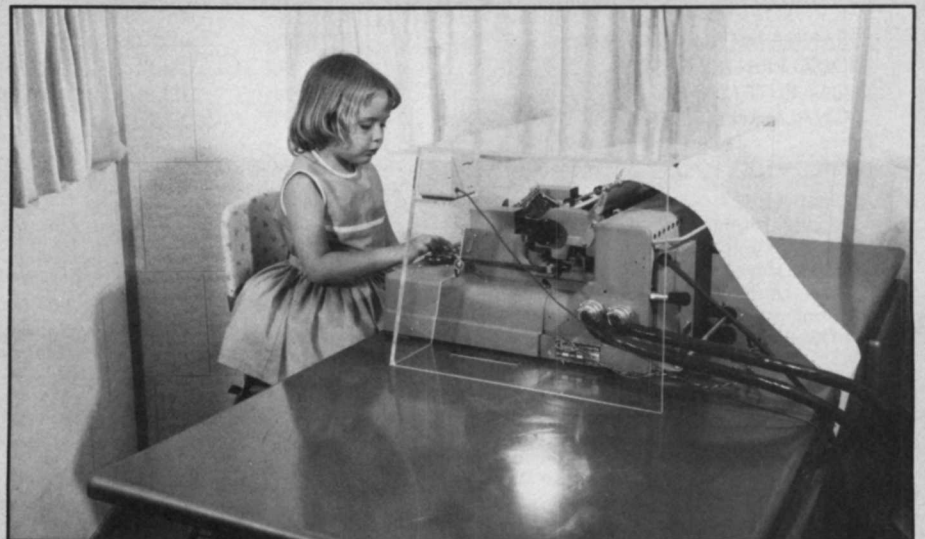
Perhaps with the technology available at very low cost today, some others will dust off the teaching/learning methodologies of Moore and his colleagues and put them back into use.

## The Original Talking Typewriter

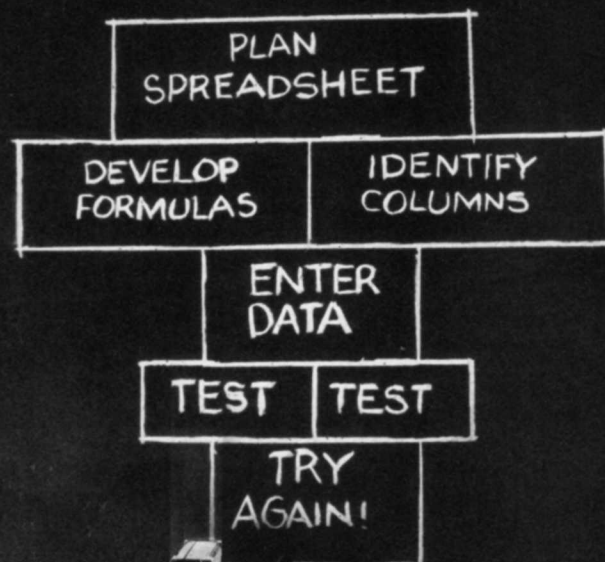
David H. Ahl



*The very first Edison Responsive Environment (ERE) was built in 1963. Children quickly dubbed it the "Talking Typewriter."*



*The first Talking Typewriter was installed at the Hamden Hall Country Day School near New Haven, CT.*



## THE RESULTS YOU WANT WITHOUT ALL THE STEPS.

Get a jump on using Multiplan™, VisiCalc®, and SuperCalc® with Sams new Mind Tools™, the enhancements that work with your electronic spreadsheet to give you the results you want immediately!

Mind Tools take the preliminary steps out of using your electronic spreadsheet program. They automatically supply your electronic spreadsheet with the correct formulas and column headings for whatever calculations need to be done. All you do is enter the figures you want calculated, and the answers appear instantly!

To get started, all you need is your regular version of Multiplan, VisiCalc, or SuperCalc, plus the corresponding Mind Tool programs for your microcomputer. Sams complete documentation, including a quick-reference guide, makes Mind Tools easy to learn and use, even if you've hardly used your spreadsheet before!

Available For	APPLE®	IBM® PC	TRS-80® Model II
Multiplan	\$79.95	\$89.95	
SuperCalc		\$89.95	
VisiCalc	\$79.95	\$89.95	\$69.95

Multiplan is a trademark of Microsoft Corporation. SuperCalc is a registered trademark of Sorcim Corporation. VisiCalc is a registered trademark of VisiCorp. IBM is a registered trademark of International Business Machines, Inc. Apple is a registered trademark of Apple Computer, Inc. TRS-80 is a registered trademark of Radio Shack, a Tandy Corporation. Mind Tools is a trademark of Expert Systems, Inc.

You'll be amazed at what you can do with:

- Sams pioneer Financial Planning Mind Tools and their 17 business/finance calculators
- NEW Sams Real Estate Analysis Mind Tools, with special income-property buy/sell and profit planning calculators
- NEW Sams Property Management Analysis Mind Tools, with custom calculators for income-property management
- NEW Sams Personal Finance Analysis Mind Tools, with unique, in-depth calculators that help apply forecasting and other sound business principles to personal income and expense management

Get Sams Mind Tools from computer stores and bookstores nationwide, or directly from Sams. Call 800-428-3696 or 317-298-5566 and ask for Operator 432.

In Canada, contact Lenbrook Electronics, Markham, Ontario L3R 1H2. Prices subject to change without notice.



**Sams Books  
and Software**

**Howard W. Sams & Co., Inc.**  
4300 West 62nd Street, P.O. Box 7092  
Indianapolis, IN 46206

CIRCLE 185 ON READER SERVICE CARD  
AD432

## Talking Typewriter, continued...

friend, or pocket. Level Three has even longer words, such as *achieve*, *business*, and *typewriter*.

After you have tried spelling ten words, the typewriter announces your score and goes on to a second set of ten words.

To listen to the entire vocabulary, hold down the FIG key and the spacebar at the same time, and the voice will recite the entire list of 160 words.

"When you are able to spell all the available words in my memory," the colorful manual says, "then we can consider moving on with an additional memory module available from your toy shop." This plug-in ROM slides onto the end of a printed circuit board located at the forward end of the battery compartment.

### The Manual

The 32-page manual, printed in four colors, is very good, with many illustrations, large type, and all the details. It provides a drawing of the machine with callouts that identify all the exterior parts by name, shows how to insert paper, how to insert the four C-cell batteries, and tells exactly what each type of key does.

The manual notes that "if... you don't make any entry for 10 seconds, then I'll remind you of the word you are attempting by repeating it. If you still don't make an entry, I'll assume you have gone for dinner and switch myself off after about 2½ minutes.

THIS IS THE SIZE  
OF THE TYPE IN  
THE PETITE ELEC-  
TRONIC TALKING  
TYPEWRITER;  
& ? \$ % ½ ¢

Figure 2. The Talking Typewriter prints fairly well, and has several characters not often found on small machines.

The manual ends with instructions on how to change the ribbon cartridge, how to lay out a letter, a list of all the words in each level, and suggestions for various games to play with the machine, such as taking turns with another person to see who can go the longest without making a mistake.

### The Box

The box in which the Talking Typewriter is packed has some information printed on it that appears nowhere else: The typewriter may be operated by a six-

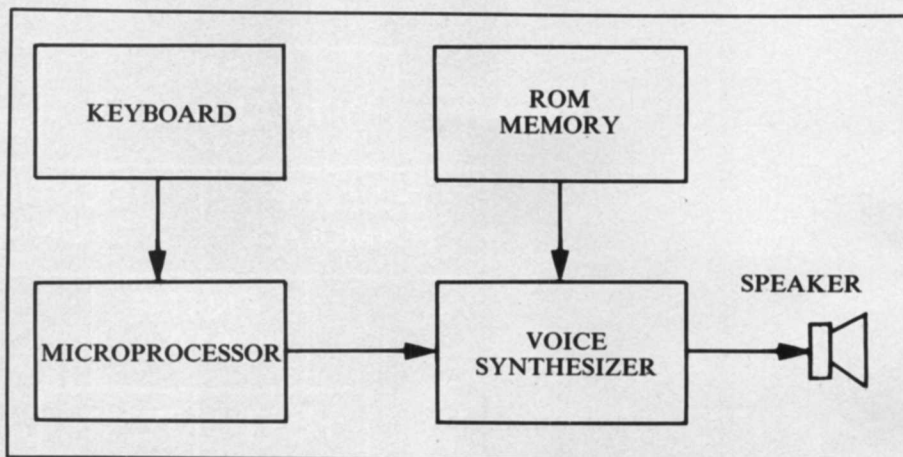


Figure 3. The block diagram for the Talking Typewriter is very simple, because the microprocessor and voice synthesizer perform many housekeeping functions that would otherwise require several more chips.

volt AC adapter. It is recommended for children of four and up. The keys print in lower case in the United Kingdom. The ribbon prints over 30,000 characters.

Designed for both the U.S. and Canadian markets, the box is printed in both English and French. Thus the typewriter is also called "La Machine à Écrire Parlante Electronique."

### How It Works

The Petite Talking Typewriter is based on a variation of the Texas Instruments "Speak and Spell" voice-synthesizer module (also called a speech generator) made in Hong Kong under a license from TI.

The block diagram is very simple. When the machine is switched on, the microprocessor scans the keyboard several thousand times a second to see which key has been pressed. (No information is available on what type of microprocessor is used.)

When a key is pressed, the microprocessor decides which letter has been selected and signals the voice-synthesizer chip. The microprocessor also keeps track of the user's spelling mistakes.

The voice synthesizer asks the ROM memory for the combination of bits required for the letter or number selected at the keyboard; the ROM contains the 160-word vocabulary in the form of 128,000 bits of encoded speech data.

The synthesizer then sends the group of bits through a digital-to-analog converter, and the waveform is amplified and sent to a 2¼" speaker that reproduces the sound of the letter or number.

The synthesizer also contains a clock that times the speech; delays are inserted between letters and words to space them

out and thus make the phrases sound more lifelike.

### Where It's Made

Press the key for the last letter of the alphabet, and the British-accented voice says, "zed," not "zee," because the Electronic Talking Typewriter is made in Nottingham, England, by Byron International, manufacturers of toys and an inhaler device for asthmatics.

Byron is a division of a highly diversified \$450 million conglomerate, Dobson Park Industries Ltd., also of Nottingham.

The Talking Typewriter is marketed in the U.S.A. by Wesco International, which manufactured toys in the U.S.A. for many years, but no longer does. Wesco's first relationship with Byron was as the U.S. distributor for its products; it is now a wholly owned subsidiary of Byron.

Wesco markets other toys, including a talking cash register, several sewing machines, three children's typewriters, and the Sindy line of dolls.

According to the Wesco catalog, "the real benefit" of the Talking Typewriter "to the child and the parent is that they can see the mistakes typed before them, and they actually have a hard copy." The catalog notes that the Word Challenger add-on vocabulary unit adds another 140 words, and that it "gives six levels of difficulty and an amazing choice of commonly misspelled words, teasers and mind bogglers."

The Electronic Talking Typewriter was \$129.95 last Christmas at F.A.O. Schwartz in New York City and has been offered at Toys-R-Us for \$79.95. If you can't find the typewriter in your area, it is available from Wesco International Inc. (2218 Enterprise Ave., Jackson, MI 49203) for \$79.95. □

# RENT SOFTWARE BEFORE YOU BUY!

from our

## SOFTWARE RENTAL LIBRARY

You can now RENT the most popular software available for just  
**20-25%\*** of Manufacturers' Retail Price

- Eliminate the risk—rent first!
- 100% of rental fee applies toward purchase
- All purchases are 20% Off of Manufacturer's Suggested List
- Rentals are for 7-days (plus 3 days grace for return shipping)

### SPECIAL INTRODUCTORY OFFER

There are now 2 different plans to choose from:

Join the **Game Group**, \$25.00 per year and rent as many games as you like for only 20-25% of Mfrs. Sugg. Retail Price.\*

Minimum order, 3 game rentals

Join the **Business Group**, \$50.00 per year and rent as many business application programs as you like for only 20-25% of Mfrs. Sugg. Retail Price.\*

### REMEMBER, THESE ARE NOT DEMOS, BUT ORIGINAL UNRESTRICTED SOFTWARE PROGRAMS

(complete with manuals in original manufacturers' packages)

**To Immediately Order, or for more information:**

**UNITED COMPUTER CORP.**  
Software Rental Library  
Culver City, California

Canadian Orders Welcome

Toll Free CALL 1-800 992-7777

In California CALL 1-800 992-8888

In L.A. County CALL 1-213 823-4400

\*Plus postage and handling



# A Very Friendly Database Program For The Apple

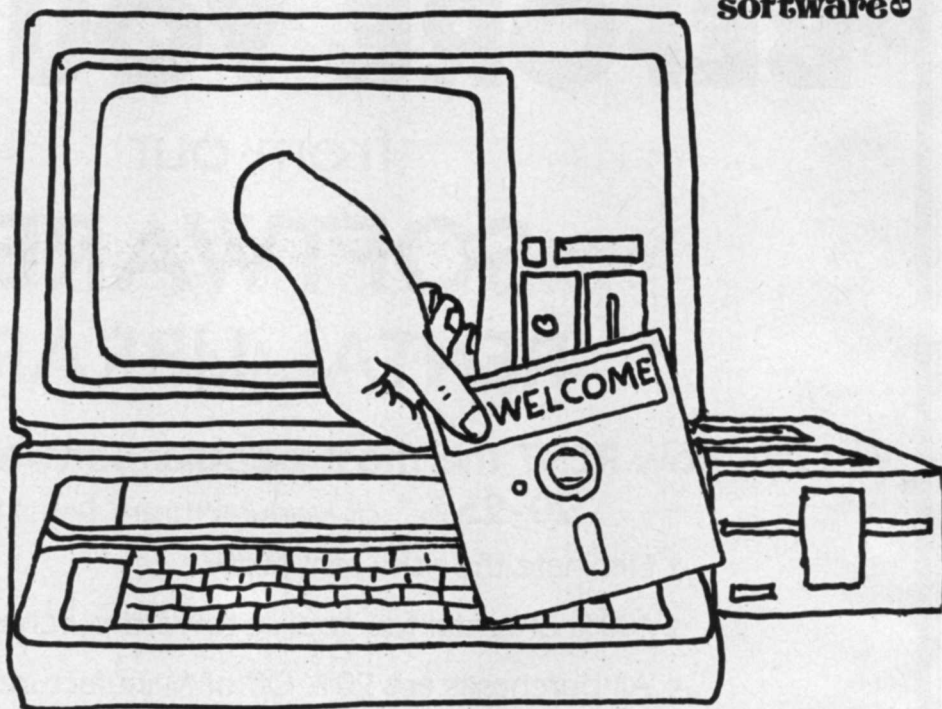
There are currently dozens of database programs written for the Apple II computer. They range all the way from simple "file card" types, to multi-file relational systems costing many hundreds of dollars. The majority of them fall somewhere in the middle of this range, and this is where the competition is most intense.

The variety of features and prices makes choosing difficult. You must match features with needs, of course, but you must also try to find a program that you will still like six months or a year down the road—and one that is continually being updated so it will not become obsolete.

In terms of a database program itself there are many more questions to answer. Is the program simple or complex? Does it *appear* simple or complex (a rather different thing). Is it easy or difficult to learn? If it is difficult to learn, is the effort required justified by the performance? The answers to these sorts of questions will determine whether the program languishes on your shelf or becomes a much-used and trusted friend.

In many ways learning to use a database program (and other computer programs as well) is much like making a friend. You expend a great deal of time, effort, and psychological energy before you knew whether the program (or the friend) will turn out to be worthwhile.

If you discover something in a database program that is a bother, you will probably have to put up with it. Reading the documentation will not tell you how good a friend your program will become because most annoyances become such only through repeated use.



## Terry Harmer

The newest database program from High Technology Software is *Information Master*, version 5.2, a program that falls squarely in the most competitive price range. In addition, there are two accessory programs that enlarge its

functions and capabilities. The complete three program set consists of the following:

*Information Master* costs \$150 and includes Data Entry, Data Modification, Report Generation, and Backup Utility modules.

*Data Master* version 3.5 costs \$100. It includes programs to reorganize and transfer data, rename a system, modify a field type, and transfer format files.

*Transit* version 3.0, which costs \$50, is a file translator.

With these three packages you can do almost anything you wish with your data. The screen formatting, while at times rather unusual, is neat, attractive and clear. Most commands are single keystroke (not requiring RETURN), so movement through the programs is fast and sure. Error checking on input is for the most part accurate.

## Overview

The documentation subsequent to version 5.0 of *Information Master* has been extensively rewritten. There is now a complete tutorial section as well as a reference section. Instead of providing a sample file, the tutorial shows you how to create your own sample file from scratch. Starting from a very simple file, the features of *Information Master* are

## creative computing SOFTWARE PROFILE

**Name:** Information Master;  
Data Master; Transit  
**Type:** Database and utility software  
**System:** Apple II+, IIe  
**Format:** Disk  
**Language:** Basic  
**Summary:** A good choice for use on less than 1000 records. Excellent error handling and ease of use.  
**Price:** Information Master, \$150  
Data Master, \$100  
Transit, \$50  
**Manufacturer:**  
High Technology Inc.  
Software Division  
2201 N.E. 63rd St.  
Oklahoma City, OK 73113

# INTRODUCING ULTRA TERM™

## YOU'LL LOVE THE VIEW!



With UltraTerm, the revolutionary new card from Videx, you'll enjoy sweeping panoramas of spreadsheets that you've never seen before: 128 columns by 32 lines, 132 columns by 24 lines and even 160 columns by 24 lines. You'll revel in the scenics of a whole year of records stretching out across your screen.

You'll also delight in the new horizon of 80 columns by 48 lines—double the lines you normally have. So your word processing will reveal a "depth of character" never possible before!

Another breath-taking view of UltraTerm—it delivers absolutely flicker-free, state of the art display, with 8 x 12 character matrix giving you preposterously clear, readable characters. Not only will you see **more** characters on your screen (a whopping 4096 possible), but they'll also be larger and more readable than the characters you read every day in your news-

paper! And you can differentiate those characters in several modes: normal (white on black), inverse (black on white), bright intensity and dim intensity.

UltraTerm features a built-in soft video switch and has complete firmware support for BASIC, Pascal and CP/M®. Use it with the Apple® II, Apple IIe, Apple III and Franklin.

*UltraTerm. Come on over and enjoy the view.*

**Suggested retail price: \$379**



897 N.W. Grant Avenue, Corvallis, OR 97330  
503-758-0521

Apple is a registered trademark of Apple Computer Inc. CP/M is a registered trademark of Digital Research Inc.

**CIRCLE 227 ON READER SERVICE CARD**

# Introducing a new high in computer skill games

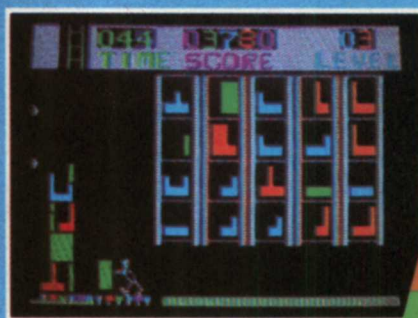
Think balancing a pile of blocks is kid's stuff? Think again. Building a stable tower in this game takes muscle, a keen eye and a good bit of planning.

Barnaby, Highrise's master builder, supplies the muscle. But it's up to you to select blocks of various shapes and sizes from any of five chutes. Then load 'em onto the springboard in any of five positions and flip 'em up onto the pile.

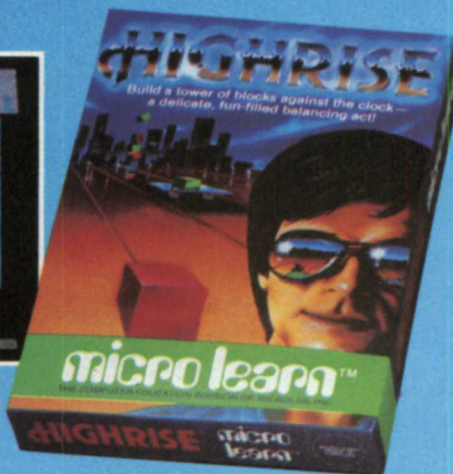
Plan your block selection and placement correctly and you build a balanced pile. Stack 'em wrong and your pile comes crashing down.

Each block you add racks up more points. Complete a pile and Barnaby climbs up and takes you to the next level of difficulty. But hurry—you're piling blocks in a race against the clock.

Highrise. It's a new high in computer skill games. Recommended only for players with a keen eye, an agile mind and very steady nerves.



Available for Apple II™ and IIe,  
IBM PC,™ Commodore 64™  
and Atari 800™



## micro learn™

THE COMPUTER EDUCATION DIVISION OF MICROLAB, INC.

Highrise™ is a registered trademark of MicroLab, Inc.  
© Micro Lab 1983. MicroLearn is a registered trademark of MicroLab, Inc.  
MicroLab, Inc., 2699 Skokie Valley Road, Highland Park, IL 60035, 312/433-7550

CIRCLE 240 ON READER SERVICE CARD

Figure 1.  
Create/Modify  
System Format.

```

OLD SYSTEM: SAMPLE                                LEN=291
1 CODE ,N5 11 COMMENTS: ,A50
2 SORT NAME ,A20 12
3 LABEL NAME ,A36 13
4 REFERENCE ,A36 14
5 ADDRESS-1 ,A36 15
6 ADDRESS-2 ,A20 16
7 CITY/ST/ZIP ,A36 17
8 AREA CODE ,A3 18
9 HOME PHONE ,A8 19
10 BUS PHONE ,A8 20

SORTS:
1 2 BY BY BY BY BY
2 1 BY 2 BY BY BY BY
3 8 BY 10 BY BY BY BY
4 BY BY BY BY BY BY
5 BY BY BY BY BY BY

F = UPD FIELDS P = PRINT
S = UPD SORTS V = VIEW
<RTN> = END/UPDATE N = NEW SYSTEM

```

gradually introduced. The writing is clear and readable.

Sample screens are printed at important points so you can compare what is on your screen with what is in the manual. An index is provided.

The *Information Master* program is well thought-out and complete. A great deal of effort has gone into screen formatting and keyboard use. The programmers at High Technology Software understand how people use a program. You can go away for three months, and when you come back to the program you don't have to re-study the documentation to use it. That is a sign of careful design.

For example, the Create/Modify System Format screen, which displays the complete system format, all fields, their lengths and types, all the sorts and sub sorts, record lengths and so forth, is shown in Figure 1. There is an enormous amount of information on this page, yet it is clear and readable.

#### "Special" Features Standard

The back-up utility of *Information Master* is called Transfer Files. It is a function of this module to make back-up copies of your data. In most database programs this function simply copies the disk, either by file name or by disk track. Not so with *Information Master*.

This utility will transfer either the entire file (complete with all your data) or only the system format (the file definitions as well as the report and sort formats but no data). Such a system (without data) can be easily modified, adding or subtracting fields or changing field types from within the basic *Information Master* program itself.

This is a very simple way to create a system similar to one you already have. You transfer the files without data, then make any changes in the file structure you want, and you have a new file.

If you just want to transfer data to another disk, Transfer Files does that

easily. The program reads a series of individual records from the source file and then writes that group to the destination file. This provides a good check of file integrity since each record in the file is individually accessed and inspected.

If the program finds a bad record, it intercepts it, marks it, counts it, and writes it to the destination disk with

### Another example of extra value is the inclusion of global record editing in the Information Master program.

\*BAD\* written in the first five positions of each field in that record. When the transfer is complete the program tells you how many \*BAD\* records it found. You can then go through your file and using the global editing feature delete those records. You will lose the \*BAD\* records, of course, but not the rest of your file.

Another feature not included in most database programs is almost a requirement for mailing list applications—the ability to close up unused lines in a mailing label format without losing track of where the top of the next label is. Where most programs leave an unused line blank, *Information Master* closes up the blank address line and adds that line to the bottom of the label so the total line count remains the same.

Another example of extra value is the inclusion of global record editing in the *Information Master* program. Global editing is the ability of the program to go through its entire file looking for records that you specify and either delete them or change a field according to your

specifications. Using this feature, you can make massive changes to your files easily and automatically.

Another unique feature is called a print-time variable. This is a variable that you specify when a report is printed. For example, if you wanted to use the finance charge amount as a print-time variable for your accounts receivable report, you would first tell the program what question you wanted it to ask when it printed the report, e.g., ENTER FINANCE CHARGE PLEASE? When it is time to print the report, *Information Master* will print on your screen that request for information and wait for you to type in the answer. The number you enter is used for any calculations that involve that particular variable when the report is printed.

For example, your finance charge may normally be 1% of the unpaid balance. If you made this a print-time variable, the program would ask you what finance charge you wanted for this particular report and you could answer with any number. This gives "what if" capability to a database program.

There are many other helpful features in the *Information Master* program as well as many little enhancements and details that make it an exceptional value. Some features just seem to appear when you need them. When modifying a report format, for example, your new format is saved upon exit. What if you change your mind? What if you can't remember how the report was before you started to change it around? How do you get your original report format back without having to rebuild it?

I was staring at the very first of the modification screens in exactly this position, wondering what to do when I decided to press the left arrow once more. The message IGNORE ALL CHANGES Y/N? appeared. It was as if the program had been reading my mind. It does not take many of these touches to make a program my friend.

#### Limitations

One of the reasons for the quality of the *Information Master* program aside from the skill of its authors is that they have limited their goals. By not trying to be all things to all people they are able to polish and hone to perfection. Chief among these chosen restraints are number of records (1000 or disk capacity), number of fields per record (20), Apple DOS, six sorts (with five sub-levels in each sort), and ten lines per record for reports.

These limits are a compromise between system capability and human needs and seem to be well chosen.

This program is not for the impatient, however. There are points at which you

sit tapping your fingers waiting... waiting... waiting... for something to happen. For example, the wait is about 40 seconds for the PRINT FORMATTED REPORT module to initialize. After that everything else moves along smoothly. Informational messages appear on the screen if anything unusual is about to happen and these messages are constantly updated so that you know the program is still running.

### Data Master

The second program in the family is *Data Master*. This is basically a file restructuring utility.

The program takes two dissimilar files and transfers data from one to the other. This means that you can take any file and transfer parts of it to any other file. Thus, you can add or subtract fields and change field lengths or types without having to re-enter data.

If this were all it did, *Data Master* would be a useful and valuable utility, but it does much more. It allows you to reorganize your data while you transfer it. This turns it from a useful utility into an exceptional one.

For example, you can do math operations on your data and put the results into new fields. But the really creative feature allows you to take any part of a field or fields (a character or group of characters) and add them to any other field. You could, for example, take parts of several fields, combine them, multiply by another field, subtract a constant and

put the result into a new field. The feature is both effective and useful.

The second function of the *Data Master* program is to allow you to rename a system (file) and its associated report, sort, and index files with one stroke. This is very convenient and fast when you have the same file on several disks and want to change the name on all of them—CHECKBOOK 1982 to CHECKBOOK 1983 for example. It saves a great deal of renaming.

You can also change a field type very quickly and simply with this program. You can change any field from any type to any other type (alpha, numeric,

**Unfortunately you  
cannot use Transit to  
put Information Master  
files in formats  
readable by other  
programs.**

dollars/cents). You may get strange results changing alphabetic fields to numeric ones, but you are allowed to do it.

The final function of the *Data Master* program is to transfer newly created or modified report formats to all the disks

on which their systems reside without affecting the data on those systems. This doesn't sound like much, and you probably will not use it often, but it will save you an enormous amount of time if you ever need it, because you won't have to recreate the report formats for each disk. You just set up your formats and the program transfers them to all the disks you request.

### Transit

The second accessory to *Information Master* is *Transit*. This companion program allows you to translate almost any Apple DOS file into a file format that *Information Master* can understand. It writes the format and then transfers the data. If you have a data file created by *File Cabinet* for example, you could use *Transit* to turn it into an *Information Master* file. Thereafter you would use *Information Master* to add, modify, print or otherwise manipulate the data.

You could take a file created by a program written by a friend and convert it to an *Information Master* format with *Transit*. You could then use *Data Master* to add some fields of your own and delete some you don't need. Finally, using all the facilities of *Information Master* you could search, sort, edit, and print the file in any way you wanted.

Unfortunately you cannot use *Transit* to put *Information Master* files in formats readable by other programs. *Information Master* files are in standard Apple DOS, however, and the documentation provides the *Information Master* file formats. This makes it possible to write Basic programs that access *Information Master* files and allows you to write programs that translate *Information Master* files into formats for other programs.

*Transit* has one problem—it may (very rarely) hang when “building system.” This is what actually happens. Just before the program tries to “build system” it needs a fresh disk to which to write your new system, and it intends to initialize whatever disk you give it. Before it does the initialization, however, it takes a peek at the disk to see if you are about to destroy something important. If it sees a blank disk all is well. If it sees a normal DOS disk all is well. If it sees almost anything else all is still well.

There are, however, some very strangely formatted disks, and occasionally one of these will provide *Transit* with some strange data. *Transit* may then do one of two things when it begins to set up the format definition files. It may build the system file endlessly until the disk is full (at which point you are informed of this fact and gracefully returned to the menu), or it will spin the



# Can you tell the IBM<sup>®</sup> from the Transtar 130?

A

Letter quality  
standard of  
the industry

5x magnification

One of these two print samples was generated by an **IBM Selectric II**: the letter quality standard of the industry.

The other was generated by the new **Transtar 130** letter-quality printer.

B

Letter quality  
standard of  
the industry

5x magnification

**A**nd print quality is just the beginning! The new Transtar 130 daisy wheel printer is also plug-and-go compatible with the best-selling word processing packages! It features bidirectional printing, superscript, subscript, underlining and a true boldface. Retail price? **Only \$895.**

Quietly producing copy at 18 cps Shannon text speed, the Transtar 130 also features a unique autoloader button to make printing on letterheads a breeze! Three new daisy wheels have just been made available for the 130 from your dealer: letter gothic (shown), script, and a 15-pitch "gothic mini"—perfect for printing spreadsheets to fit on one page!

Offering an end-user warranty period of a full six months, the Transtar 130 is an extraordinarily reliable machine. Its minimal failure rate runs less than 1%, but if your 130 should ever need repair, a nationwide network of authorized Transtar service centers stands ready.

Have you decided yet whose type is whose? If you picked A...You picked Transtar. The new standard for letter quality printing.

## Transtar

P.O. Box C-96975, Bellevue, WA 98009



IBM is a registered trademark of International Business Machines, Inc.

CIRCLE 221 ON READER SERVICE CARD

## Information Master, continued...

disk endlessly trying to write a file that is never longer than one sector.

The solution is simple. Just use another disk, initialize the disk with Apple DOS or erase the disk with a bulk eraser or degaussing utility. This problem seems to occur mostly with disks that have been used as *DB Master* data disks.

All in all *Transit* is a very helpful utility. The documentation alone will give you a nice introduction to file types and structures.

### Summary

The basic feel of these programs is one of relaxation and flowing smoothness. Nothing is jerky, abrupt, surprising or disconcerting. Informational messages appear on the screen if anything unusual is about to happen and are constantly updated so that you know the program is still running.

These High Technology programs definitely live in the real world. They are designed for people. We constantly make

mistakes, fail to plan ahead, and do various and sundry other unpredictable things. *Information Master* is designed and written with this type of behavior in mind.

*Information Master* is a program that gets better and better the more you use it. Once you have familiarized yourself with the program, you almost never have to refer to the documentation again.

Everything in the program is easily accessed. Reports can be altered immediately, sorts changed or eliminated, and selection criteria specified—all with ease. The apparent simplicity of the program bespeaks its sophistication. You can move back and forth through the various parts of the program easily. Screen formatting is clear, uncluttered and concise.

### Flies In The Ointment

Although I could find no "bugs," in any of the programs, there are things that I wish could be included or changed. Here is my wish list for *Information Master*:

- I wish there were a way to control your printer from within the program. If you need 132 columns or emphasized print, you must set up your printer before you boot the program disk.

- I wish there were a way to store selection criteria, printer control strings, and print options for specific reports. These must be specified each time the report is run. It would make reports flow much more smoothly if you didn't have to enter these items each time.

- I would eliminate the CTRL-G "beep" which accompanies each record entered; it is annoying and completely unnecessary.

- I would like to be able to decide whether *Transit* will initialize a disk or not. Then I could transfer more than one file to a given disk.

- I would like to be able to print out report formats. Currently you have only your planning sheet for reference. Since most people will just dive into the program and "wing it," having some way to print out what you have set up would be very helpful.

- I would eliminate the automatic formfeed at the end of reports, system printouts and so forth. I would like to be able to put several system formats on a single sheet of paper. As it is, I just pull the paper off the tractor pins and wait while the program steps through 40 or more linefeeds.

At \$300 for the three modules this system is not cheap. But it is, in my opinion, the very best database available if you have a relatively small number (less than 1000) records. I recommend it. □

# The MAGIC you've been waiting for is now available for only \$2,295

## Magic has it all!

- **Compatibility**  
Magic comes with CP/M 2.2 giving access to a large variety of proven software.
- **Portability**  
Magic's keyboard with numeric pad stores easily within the system housing for transporting to different locations.
- **Capability**  
Magic provides a high resolution monitor and two DSDD disk drives for substantial data storage.
- **Flexibility**  
Magic comes with a RS232C and a parallel adapter — ready to be connected to a modem and/or printer of your choice.
- **Useability**  
Magic comes with Perfect-Writer®, Perfect Speller®, Perfect-Calc®, Perfect-Filer® and CBASIC™ ready for immediate use.
- **Reliability**  
Magic is a "quality" system using "state-of-the-art" components and is backed by a 120-day unconditional warranty.

You can believe it's



For additional information, contact your local computer dealer or

**MAGIC Computer Company, Inc.**  
2 Executive Drive • Fort Lee, NJ 07024  
(201) 944-6700 • 800-221-1565

# When it comes to superior performance, we study our lines very carefully.

Superior printer performance is not a fluke. It evolves from analyzing printed line after printed line. Taking the time to test and retest. After 30 years of manufacturing precision parts, we know that there are no shortcuts.

And so we took the Gemini-10X and methodically put it through its 120 cps pace. We achieved a print head life of over 100 million characters with an extremely precise dot alignment creating each crisp character.

So far so good.

Next, sophisticated performance demanded versatility. A wide choice of character sets, a buffer expandable to 8K, and the ability to interface with all popular personal computers. We added macro

instruction, giving Gemini-10X the capability to perform up to 16 operations with one command. We included as standard a paper feed system that has a friction and fully adjustable tractor feed. Then we even built in the dexterity to print graphics and text on the same line.

Done.

And, of course, staying the best means constant reviewing and fine-tuning. Keeping the Gemini easy to find, easy to afford and so reliable it can be warranted for up to twice as long as its major competitors.

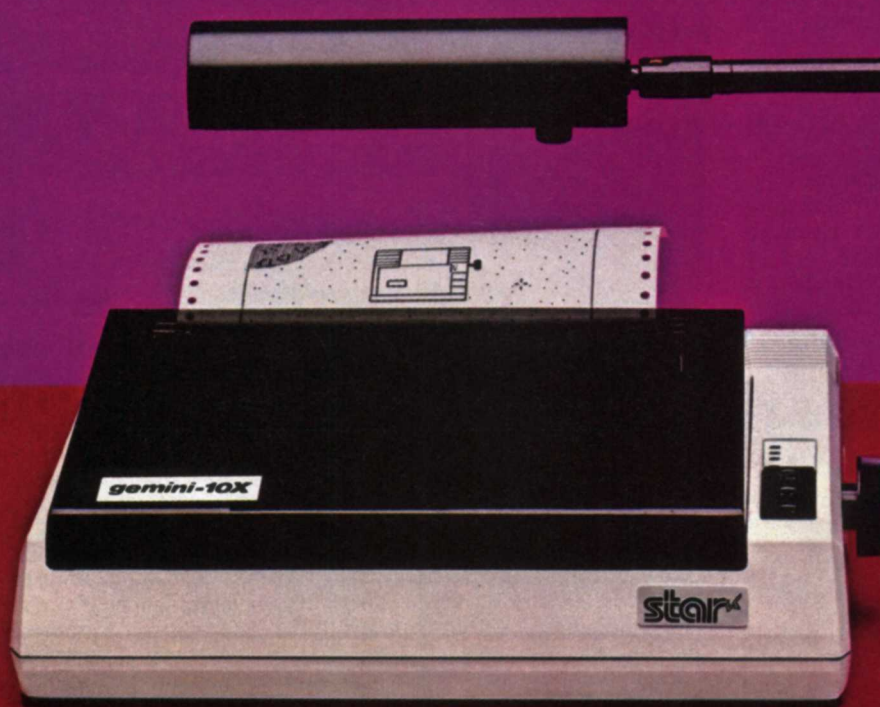
Only the most careful engineering has built the new hard-working Gemini-10X. You'll applaud its performance.

CIRCLE 208 ON READER SERVICE CARD

**star**<sup>TM</sup>  
micronics·inc

**THE POWER BEHIND THE PRINTED WORD.**

Computer Peripherals Division  
2803 N.W. 12th Street, Dallas/Ft. Worth Airport, TX 75261



# WordPlus—PC

## An Easy-To-Learn Word Processor

**Joe Devlin**

*WordPlus—PC* is a full-feature word processor for the IBM Personal Computer from Professional Software. The chief advantage of *WordPlus* is that it is extremely easy to learn to use. This is accomplished through the use of color-coded function key labels and extensive screen prompts that save you from having to memorize complicated word processing codes. The chief drawback is that the software can be annoyingly slow in performing some routine applications.

Although the package is new to the IBM, a closely related package called *WordPro* has been distributed by Professional Software for Commodore computers for some time. Although *WordPlus* and *WordPro* have a very similar look, I am told that *WordPlus* is a completely new package and not a conversion of the older Commodore package.



### creative computing

#### SOFTWARE PROFILE

**Name:** WordPlus—PC

**Type:** Word processing

**System:** 64K IBM Personal

Computer and compatible printer

**Format:** Disk

**Language:** Machine

**Summary:** Full-featured and easy to use but sluggish

**Price:** \$395

**Manufacturer:**

Professional Software, Inc.  
51 Fremont St.  
Needham, MA 02194

*WordPlus* comes packaged in a box that includes the user's manual, a disk, a reference card listing the major word processing commands, and two sheets of stick-on labels. It is the stickers that make this word processor so easy to learn to use.

The first sticker is red and is placed over the Alternate key found at the lower left of the IBM keyboard. A green sticker is used to cover the left SHIFT key. The remaining stickers are applied to the ten IBM function keys.

Each function key sticker has three color-coded commands printed on it. These indicate which word processing commands can be accessed by which key. The most commonly used word processing commands are printed in blue and are accessed by pressing the appropriate function key once. Press key F7, label INST MD in blue, and the program

will insert text wherever the cursor is placed.

Commands that are used less often are printed in red or green and are accessed by pressing both a function key and either the red Alternate key or the green SHIFT key. There is a help function that can be used when commands have been forgotten. A stroke on the key labelled Help will call forth a list of keys and commands. If problems persist, there is a toll free customer support number you can call. I found the phone staff to be patient, well informed, and supportive.

#### Features

*WordPlus* has many nice features. It is a full screen editor, which means that you can reach any part of the text simply by using the cursor control keys to scroll where you want to go. All the features normally expected in a word processing

Most people are familiar with plain label prices. They mean savings without sacrificing quality.

Now dilithium Press, famous for its user-friendly computer books, introduces dilithium Software. Quality book/software packages at affordable prices.

Each book is easy to read with lots of useful applications and troubleshooting hints; most contain complete source listings.

And a bonus.

You can purchase the book separately for around \$19.95. But for a mere \$10 extra, you can have the book *and* the software on diskette or cassette.

Plus, you'll have a toll-free customer service number and a forever replacement guarantee.

You'll find dilithium Software at your local bookstore or computer store. However, if there's

no store near you, order directly from us.

Call or write today for our catalog, or for more information. And enjoy the dilithium Software label—at the plain label price.



**dilithium Software**

P.O. Box E  
Beaverton, Oregon 97075  
800-547-1842 or  
646-2713 inside Oregon

CIRCLE 140 ON READER SERVICE CARD

# Introducing dilithium Software. Brand name quality. Plain label prices.



# BECOME AN INTREPID SPACE ADVENTURER...

## AREX



by William Muk

CoCo version by Roger Schrag

Atari version by John Anderson

Far beyond the known galaxies, you venture deep into the vast reaches of outer space. But you are not alone! In a flash, without so much as a how-do-ya-do, they're in hot pursuit and you're left to do before you're done unto. **Can** you elude your pursuers? **Will** you elude your pursuers? And who **are** these guys anyway? Find the answers to these and other compelling questions in AREX. See your dealer today!

*AREX ... Coin-op arcade realism at home for 1 to 2 players.*

### AREX

CoCo 16K TAPE .....	060-0172	\$34.95
TRS-80 Model 1 & 3 16K TAPE .....	010-0172	\$34.95
TRS-80 Model 1 & 3 32K DISK .....	012-0172	\$34.95

# ...OR FLY HIGH IN THE WORLD OF HIGH FINANCE

by George Schwenk

TRS-80 version by Dave Simmons

CoCo version by Roger Schrag

"Yas, after purchasing diamond mines in South Africa, oil wells in Saudi, and rare beer cans in Walla Walla, Washington, I had begun to wonder what other trendy commodities remained to be added to my swelling portfolio. Then a snip of a ticket girl dared to tell me (ME, Hartley J. Wormsflather III!) that my flight was overbooked. To avoid future misunderstandings, I bought the airline."

"I think I'm on to something profitable here."  
Hartley J. Wormsflather III

*AIRLINE ... A no-holds-barred strategy game for 1 to 4 players.*

### AIRLINE

ATARI 400 & 800 / CoCo / Model 1 & 3 16K TAPE ... 140-0169 \$24.95

Published by



a subsidiary of Scott Adams, Inc.

BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917

Prices Subject To Change Without Notice

CIRCLE 104 ON READER SERVICE CARD

## AIRLINE



To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog. DEALER INQUIRIES ARE INVITED.

143

## WordPlus, continued...

package are here. The list of major functions includes text insertion and deletion, search and replace, personalized form letters, headers and footers, boldface and underlining, and automatic page numbering. You can print one document while you edit another.

**WordPlus** can also merge information from other documents or other programs such as *VisiCalc*. The user's manual includes a well written tutorial section, a reference section describing each command in detail, and an index.

Two particularly nifty features of the program are the cut-and-paste and decimal alignment features. Cut and paste allows you to carve out a rectangular block of text (of any size) and move it to any other location within the document. This feature would be especially useful to anyone who organizes numerical information or text into columns or tables. Say you wish to reverse the positions of column A and B or perhaps you want table A inserted later on the report. Cut and paste makes the move a snap.

The numerical mode is used for aligning columns of numbers around the decimal point. In numeric mode, numbers are inserted and moved to the left of the cursor until a decimal point is hit. The first step in using the numeric mode is to use the tab to move the cursor to the spot where a column of numbers should appear. Next you hit a space or decimal point, and the characters begin to be inserted to the left. The result is that all the numbers in the column are aligned with the decimal spaces.

### Built For Comfort Not Speed

Along with all the good features, the package does have some serious drawbacks. The biggest problem with the package is the amount of time it takes to perform some routine functions such as inserting and moving text. Let me outline the procedure moving this sentence to the paragraph below.

Hitting function key F6, labeled Range in blue, starts the process. In response, the bottom line of the screen will ask for the "Start of Range." Scroll the cursor over to the start of the sentence and hit the S; the bottom line will next ask for the "End of Range." Scroll to the end of the sentence and hit the E key to set the range. To insert the outlined sentence hit the Range key a second time. The prompts at the bottom of the screen will now ask if you wish to "Clear, Delete, Transfer or Insert" the sentence. Hit the T key and the program will gobble the sentence up, and the prompt will ask for the "Destination Of Text." Hit the D key and the line will reappear in the new location. Hitting the Range key a final time and typing the letter C for

Clear will wipe out the range setting, and ready the software for the next transfer.

As you see, the simple task of moving a single sentence takes nine keystrokes not counting the scrolling of the cursor. In addition, it took the computer a full 30 seconds to gobble the sentence up from its original location and to move it to its new destination. This is not a word processor for people who compose on a word processor.

Another thing I dislike about **WordPlus** is that what you see on the screen is not what appears on the printed page. Margin commands, line spacing and other format commands are reflected in the printed output but shown on the screen only as inserted command phrases. During editing, the text always appears on the screen in 80-column format regardless of how it will appear when printed.

Special characters are also inserted into the text indicating word processing

## Two particularly nifty features of the program are the cut and paste and decimal alignment features.

commands such as underline, boldface and carriage return. For example, to underline text you must insert two special characters into the text—a blue dot at the beginning of the bolding and a two sided arrow at the end. The result is that should you print out a document, make editing changes on the paper and then go back to the computer to enter your changes, the mistakes will not be in the same place on the screen as they were on the printed page.

### The Program For You?

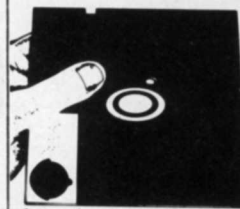
Is this the word processing package you should buy for your IBM PC? The answer depends upon your needs. If you are looking for a word processor that is easy to learn to use, and if you will use it primarily for routine typing, form letters, and jobs in which the cut and paste operation and the decimal alignment functions will see a lot of use, then maybe so.

If, on the other hand, you will use the word processor to make frequent small changes to text, this is not the package you are looking for. In this sort of use the sluggishness of the software and the number of keystrokes would probably drive you crazy in short order. □

CIRCLE 403 ON READER SERVICE CARD

## \*DOUBLES DISKETTE STORAGE SPACE!!

REDUCE YOUR DISKETTE COSTS BY 50%



"The back of your 5 1/4" single sided diskette has recording medium. All you need is an ACCURATELY placed "write enable notch"

to USE IT, on many systems. **NIBBLE NOTCH™** is a precision engineered tool designed for this purpose.

IT'S A MONEY SAVER!  
IT'S A TIME SAVER!

**\$14.95**

Add \$1.50 Postage/Handling  
(\$4.50 Foreign)

— Florida Residents Add 5% Sales Tax —

**ORDER TODAY!**  
SEND CHECK OR MONEY ORDER TO:

**NIBBLE NOTCH™**

Division of Cortran International

4211 N.W. 75th Terrace, Dept. 7 8  
Lauderhill, Florida 33319

PAT. PEND.

CIRCLE 163 ON READER SERVICE CARD

Experience  
the power of knowledge  
at the touch of a button.

*Soothsayer*  
THE ELECTRONIC I-CHING

Soothsayer is based on the amazing I-Ching or "Book of Changes" developed in ancient China as a divination medium.

**Only \$29.95**

Order now for your first  
glimpse into the future.

For Apple II+ 48K. Disk. Please add \$1.50  
postage and handling. Georgia residents add  
sales tax. Dealer inquiries invited. Send check  
or money order to:

**WARLOCK  
SOFTWARE**  
DIVISION OF TYLER INC.

1900 Emory St., Suite 318  
Atlanta, GA 30318 (404) 352-1015

\*Apple II and II+ are registered trademarks of  
Apple Computer, Inc.

CIRCLE 228 ON READER SERVICE CARD

# Commodore - 64 Word Processors



**SALE**



**SALE**

## SCRIPT 64 EXECUTIVE WORD PROCESSOR

Rated best by COMMODORE. This is the finest word processor available. Features include line and paragraph insertion/deletion, indentation, right and left justification, titles, page numbering, characters per inch, etc. All features are easy to use and understand. With tabs, etc. SCRIPT-64 even includes a dictionary/spelling checker to make sure your spelling is correct. The dictionary is user customizable to any technical words you may use. Furthermore, all paragraphs can be printed in any order so doctors, lawyers, real estate agents, and homeowners will find contract writing and everyday letters a snap. To top things off, there is a 100 page manual and help screens to make learning how to use SCRIPT-64 a snap. This word processor is so complete we can't think of anything it doesn't have. When combined with the complete database you have a powerful mailmerge and label program that lets you customize any mailing list with personalized letters. List \$99.95. Sale \$79.00. (plus postage) Disk Only.

## COMPLETE DATA BASE

This is a user friendly database that makes any information easy to store and retrieve. The user defines the fields and then can add change, delete and search for any category he wants. When combined with the SCRIPT-64 Executive Word Processor you can search out any category (zip codes, hair color, etc.) and print super personalized letters. List \$89.00. Sale \$69.00. (plus postage) Disk Only.

## TOTAL WORD PROCESSOR PLUS 5.2

This top quality word processor was specially designed for PROTECTO ENTERPRIZES. Features include line and paragraph insert and delete, right and left justification, multiple copies, and line spacing. Extra functions include mailmerge, embedded footnotes, extra user defined character sets, plus a complete label program. List \$69.90. Sale \$56.00. (plus postage) Disk add \$7.00.

## QUICK BROWN FOX WORD PROCESSOR

(Cartridge). Nationally advertised all purpose word processor that uses menu control to let you manipulate your text. Includes the features most often asked for including right and left justification, wordwrap, and more. List \$69.00. Sale \$59.00. (plus postage).

• **LOWEST PRICES** • **15 DAY FREE TRIAL** • **90 DAY FREE REPLACEMENT WARRANTY**  
• **BEST SERVICE IN U.S.A.** • **ONE DAY EXPRESS MAIL** • **OVER 500 PROGRAMS** • **FREE CATALOGS**

WE SHIP C.O.D. HONOR VISA AND MASTER CHARGE  
ADD \$3.00 SHIPPING FOR C.O.D. ADD \$2.00 MORE  
SPECIAL SERVICES:

One Day — Express Mail add \$10.00

**PROTECTO  
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order

# COM-STAR F/T

Tractor  
Friction  
Printer

only **\$259**



- Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
- 40, 46, 66, 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
- List your programs • Print out data from modem services

## Deluxe COMSTAR F/T PRINTER — \$259.00

The Comstar is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pet, Atari 400 and 800, and Hewlett Packard). At only \$259 the Comstar gives you print quality and features found only on printers costing twice as much. Compare these features.

• **BI-DIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher through-put in actual text printing. 80 characters per second.

• **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 224 characters.

• **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop. (Add \$20.00 for RS232)

• **LONG LIFE PRINT HEAD:** 100 million character life expectancy.

• **THREE SELECTABLE CHARACTER PITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.

• **THREE SELECTABLE LINE SPACINGS:** 6, 8 or 12 lines per inch.

• **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.

• **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.

• **FRICTION AND TRACTOR FEED:** will accept single sheet paper.

• **224 TOTAL CHARACTERS**

• **USES STANDARD SIZE PAPER**

If you want more try —

## Premium Quality COMSTAR F/T SUPER-10" PRINTER — \$299.00

More Features Than MX-80

For \$299 you get all of the features of the Comstar plus 10" carriage 120 cps, 9x9 dot matrix with double strike capability for 18 x 18 dotmatrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, 2.3K buffer, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance the Comstar F/T Super 10" leads the pack!

### 80 COLUMN PRINTER \$189

Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal roll paper!

## Double Immediate Replacement Warranty

We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge via United Parcel Service, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

## 15 DAY FREE TRIAL

### OTHER OPTIONS

Extra Ribbons .....	\$ 5.95
Roll Paper Holder .....	32.95
Roll Paper .....	4.95
5000 Labels .....	19.95
1100 Sheets Fan Fold Paper .....	13.95

Add \$20.00 shipping, handling and insurance. Illinois residents please add 6% tax. Add \$40.00 for CANADA, PUERTO RICO, HAWAII, ALASKA orders. WE DO NOT EXPORT TO OTHER COUNTRIES. Enclose cashiers check, money order or personal check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail available!! Canada orders must be in U.S. dollars.

## PROTECTO ENTERPRIZES

(We Love Our Customers)  
BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order

### COMSTAR F/T

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz  
1234567890  
ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890

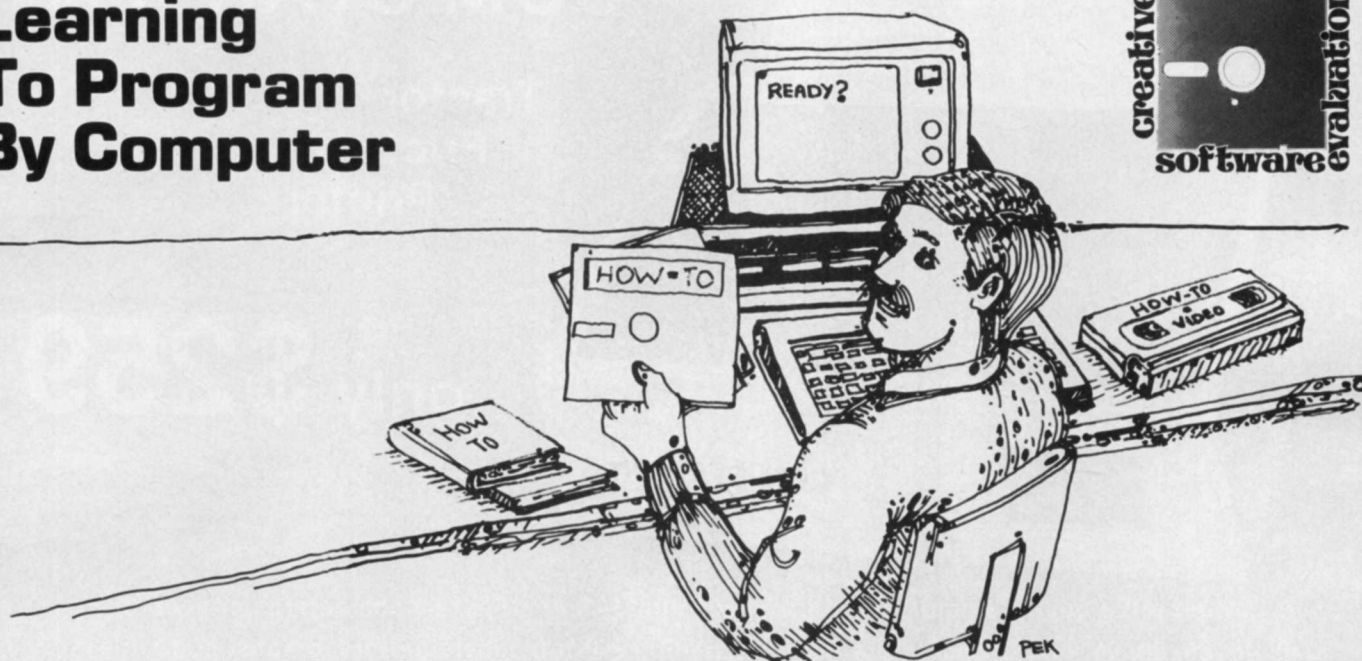
### SUPER-10"

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

CIRCLE 175 ON READER SERVICE CARD

# Learning To Program By Computer

creative computing  
software evaluator



Sitting before you is a newcomer in your life, a microcomputer.

You have read about the "computer revolution," learned about the educational advantages your children will enjoy with a home computer, and seen the great home budget applications, the games and so forth. Perhaps you have also considered taking a stab at programming.

For whatever reason, you made the big decision and now own a microcomputer. What you need now is the knowledge to use it.

Some people, when exposed to computers for the first time, tell themselves that it is too complex a subject, that they can never master an advanced technological tool like a computer. This is akin to telling yourself that you will never understand algebra—a form of self-fulfilling prophecy, an excellent way to precondition yourself to failure. The most important thing for you, the potential computer user, to understand is that if you are bright enough to drive a car and hold a job, you can operate and even program a personal computer.

Some people find that they "choke up" in the presence of a computer, as if they were in the presence of a mysterious, superior intelligence. This computer phobia strikes at home and in the office, making it difficult to acquire the knowledge you need to do your job or to learn more about your exciting and somewhat puzzling new possession.

Personal computers are designed to be easy to use at home and in the office. Yet

## Brian J. Murphy

it is important to find the best way to acquire the knowledge you need.

### Instructional Materials

Focusing on the instructional materials available to Apple II owners (there seems to be more teaching material for Apple IIs than for any other system), we have learned that first-time computer users have more options than learning strictly from manufacturers' manuals or other print materials. There are options that mix print and electronic media, including videotapes, and audio cassette

***If you are bright enough to drive a car, you can operate a personal computer.***

tapes, and computer media, including videotapes, audio cassette tapes, and computer media, including programs loaded from cassettes and disks.

First, let's look at the "by-the-book" method of learning. If you own an Apple II, you probably have an excellent set of Apple manuals which take the uninitiated from the first steps of physically setting up and powering up the Apple II system through the opening steps of programming. The best of the Apple

manuals, the Applesoft Tutorial, accomplishes this with a common sense, hands-on, learning-by-doing approach leavened with occasional witty observations. If you are willing to follow the tutorial step by step, chances are you will learn how to program. The tutorial is friendly and supportive to the new computer user.

If you are uncomfortable with the Apple II documentation, many other very good manuals that will teach you how to approach your Apple for the first time and how to program it are available in bookstores.

If you need a simple introduction to the Apple II, *The Elementary Apple* (Datamost, \$14.95, 1982) seems to fill the bill. The book approaches the subject in a manner that presupposes no previous computer knowledge. It takes you by the hand through the setup procedures, and shows you how to run prepackaged software and the first steps of programming. It is perfect for people with computer phobia.

Some manuals mix an introduction to the Apple with a more comprehensive tutorial on elementary programming. One of the better manuals is the *Apple II User's Guide* by Lon Poole, Martin McNiff and Steven Cook (Osborne/McGraw-Hill, \$15, 1981). Like the Apple documentation, it nurses you through set up and provides the basic pointers to help you use your system. It examines the techniques of programming in detail, giving you a good beginner's knowledge of Basic as found on the Apple II. The book also provides an introduction to machine language.

# Hayes

Your computer's telephone.

Phil: Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!

To all reps: Price changes on following items effective immediately:  
No. 10-111A, 10-114A, 10-AL.

Welcome to TELEMAL! Your last access was Tuesday, May 3, 1983 11:07 a.m. CHECK these bulletin boards: TELEMAL...TELESOFT...



system, they allow you to communicate over ordinary phone lines with computers and terminals anywhere in America.

But any modem will send and receive data.

A Hayes Smartmodem also dials, answers and disconnects calls. Automatically. And it does this without going through the telephone receiver, a design feature that makes it far superior to acoustic coupler modems.

**Choose your speed, choose your price.** Hayes Smartmodems are available at two different speeds and price levels. The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps.

For longer distances and larger volumes, Smartmodem 1200 operates at 1200 bps or up to 300 bps, with a built-in selector that automatically detects transmission speeds.

Both modems work with rotary dials, Touch-Tone\* and key-set systems. We've even included an audio speaker and indicator lights so you can monitor the communica-

tions process. Smartmodem 1200 has an additional indicator light that detects high-speed transmission. And, unlike many modems, both Smartmodems operate at full or half duplex, for compatibility with most time-sharing systems.

**At Hayes, all of these "extras" are standard.** We've built our reputation on superior quality. Excellent documentation. A limited two-year warranty. And a wide range of software support. Including our own hot-selling Smartcom II™ communications software for the IBM\*\* PC, making Smartmodem 300 and 1200 even easier for you to use.

See your computer dealer today for a demonstration. Then break out of isolation. Get a Hayes telephone for your computer.

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/449-8791.

Smartcom II is a trademark of Hayes Microcomputer Products, Inc.

\*TM American Telephone & Telegraph  
\*\*IBM is a registered trademark of International Business Machines, Corp.  
©1983 Hayes Microcomputer Products, Inc.  
Sold only in the U.S.A.

A personal computer without communications, is like a car without gasoline. It can't go anywhere.

It needs a special telephone (called a modem), to get you communicating with other computers. Across the city. Or the entire country.

Whether you're swapping programs with friends or club members. Working at home and sending reports to the office. Or taking advantage of a wealth of information from any of the networks or information utilities. Telecomputing greatly expands the world of your personal computer.

**And Hayes provides the communications link.** Smartmodem 300, and the faster Smartmodem 1200, work with any computer with an RS-232C I/O port. Plugging your computer directly into the phone





10,000 ft. downhole. A pressure surge. The stress increases.  
How much can the rig take before it blows?

## Turn to your TI Compact Computer.

Out in the Gulf of Mexico, you need fast answers. In seconds, the Texas Instruments Compact Computer 40™ gives you the exact pressure and what's needed to regain control.

Whatever your job, the CC-40 can go where your work takes you. It's cordless, compact and sophisticated. It gives you much of the problem-solving power of Apple™ or IBM™ personal computers. But it's a fraction of the size and price.

The CC-40 has 6K RAM and 34K ROM that can be expanded with TI Solid State Software™ cartridges for an effective memory of up to 168K. It runs for up to 200 hours on four AA alkaline batteries.

By adding TI's intelligent peripherals, the CC-40 can handle more complex tasks. There's a 4-color printer/plotter, an RS-232 interface, a computer-controlled TI Wafertape™ drive and two new

peripherals: a video interface† with built-in RF modulator and a Bell 103-compatible modem.† All compact, all low priced.

With built-in Enhanced BASIC you can write programs to your specific needs. Or use our library of preprogrammed software for engineering and scientific applications — on Solid State Software or Wafertape cartridges.

Because your field office may be just that, turn to your TI Compact Computer. And find solutions anywhere.



# TEXAS INSTRUMENTS

Creating useful products  
and services for you.

CIRCLE 289 ON READER SERVICE CARD



Apple is a registered trademark of Apple Computers, Inc. IBM is a registered trademark of International Business Machines Corp. Copyright ©1983 Texas Instruments. † Subject to FCC certification.

If these books don't suit you, don't worry; a myriad of competitors crowds the computer shelf of any good bookstore. Some titles that caught my eye are:

- *Programming the Apple*, by J.L. Campbell and Lance Zimmerman. Robert J. Brady, \$19.95, 1982. Covers Integer Basic and Applesoft Basic.

- *Applesoft Language*, by Brian D. Blackwood and George H. Blackwood. Howard W. Sams and Co., \$10.95, 1981. Covers Applesoft Basic only.

- *Apple II Programmer's Handbook*, by Richard Vile. Prentice-Hall, \$14.95, 1982. Covers Integer and Applesoft Basic, Pascal and 6502 Code.

- *Basic for the Apple II*, by Lary Joel and Martin Goldstein. Robert J. Brady, \$14.95, 1982. A Basic tutorial.

- *A Guide to Programming in Applesoft*, by Bruce Preden. Lawrenceville Press, \$12.95, 1982. Oriented to classroom and home study.

To determine which book will work best for you, spend some time thinking about how you go about learning. Leaf carefully through several manuals (not only the ones we have mentioned) before you pick one. Determine which seems easiest to read and to understand and best suited to your style of learning.

### Teaching Packages

Let's sample approaches to understanding and programming the Apple II using various media, which supplement—and even replace—the manual. We will look at a selection of teaching packages using a variety of media. They represent a sample of what is available to Apple II owners and owners of other systems.

Assuming for a moment that you have been able to follow your Apple manuals well enough to assemble your system and that you have a disk drive, you may find *Know Your Apple* by Muse Software a valuable reference. Rather than a manual, this is a disk containing a program that mixes text and graphics to explain the most basic workings of your Apple II.

After you insert the disk in the drive and turn the system on, the program displays a title page on the video screen, then a picture of an Apple system and a series of five lesson titles (this is called a "program menu"). The lessons detail information on your monitor, disk drive and keyboard and examine the back of the Apple and the insides of the system. By hitting the space bar you can select the lesson you want to see; pressing the RETURN key begins the lesson.

The lessons themselves are very comprehensive, considering the minimum of text used. The monitor lesson explains the difference between using a computer

CRT and a regular home TV for your video display and the differences between the text, low-resolution and high-resolution screens. Expert use of graphics gives you a dramatic A-B comparison between the two graphics screens.

The disk drive section explains how floppy disks work and how to care for them to prevent the loss of data. The lessons explain how information is organized on the disk, how it can be loaded from the disk into the computer

memory and how programs in memory can be saved on a disk.

The Back of the Apple section is a short lesson covering the power on/off switch, the video and cassette jacks and the slots in the cabinet, which accommodate cords for peripheral devices such as disk drives and printers.

The Inside the Apple section is the most fascinating lesson, covering the location of the 6502 CPU, differences between ROM and RAM chips, and their location in the computer. The les-

## Training Wheels for Your Apple IIe

Just before press time for the accompanying article, we received the *Cdex Training Program* for the Apple IIe. This is a three-disk set, with accompanying manual designed to teach the fundamentals of the IIe machine.

Although the accompanying manual is very helpful, you do not even need to open it to initiate the training program, and that, after all, should be the point of disk-based learning. Simply insert disk 1 and turn on your system, and the software will take it from there.

The graphics and text of the three disks are reminiscent of *Know Your Apple* from Muse, but much more

ment keys. It then provides an expedition into simple DOS commands and a look at Applesoft Basic. This disk also includes sections that contain a more in-depth view of the internal architecture of the Apple, and the whys and wherefores of DOS parameters.

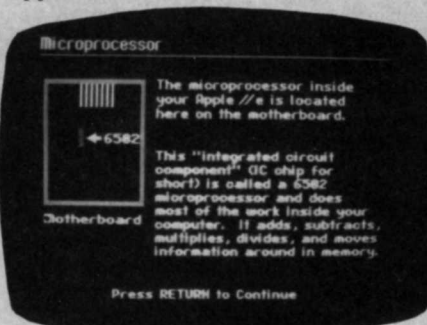
Disk 3 gets to some advanced topics. It explains advanced DOS commands, as well as DOS utilities, including Muffin, FID, Boot 13, and Master Create. Even I learned something new here. Other headings on the disk cover the topics of alternate operating systems (CP/M and UCSD), and alternate programming languages (Pascal, Logo, Pilot, Fortran, and Cobol). These areas are necessarily sketchy. The final heading on the disk covers peripherals for your Apple, ranging from printers to hard disk drives.

The looks and style of the *Cdex Training Program* are very professional, and seem to have been executed using *The Graphic Solution* from Accent Software. Each tutorial segment uses graphic and sound effects in just the right balance. Though the program does prompt for and then incorporate the user's name, this feature is not overplayed, as it is in other programs. Every heading is followed by a titlecard listing the branches available from that node, and the option is offered from that point to choose one branch or back up to the main menu. Even a novice will begin to feel comfortable with the concept of branching menus by the time he reaches disk 3 of the program.

In addition to all this, interactive exercises are provided on disk, as well as reinforcement exercises in the accompanying manual.

Even though I am not the biggest proponent of on-line tutorials you are likely to ever hear from, at \$60, I was impressed with the *Cdex Training Program* for the Apple IIe. It is very handsomely packaged, and would certainly make a fine gift for a new Apple owner.

For more information, contact Cdex Corporation, 5050 El Camino Real, Los Altos, CA 94022. (415) 964-7600.—JJA



*Cdex Training Program.*

thorough. Where *Know Your Apple* treats its topics rather superficially, and offers a disk that can be fully mastered in a few hours, the *Cdex Training Program* goes into much more detail concerning things like DOS commands and utilities, the differences between televisions and monitors, and the internal architecture of the Apple IIe. It will certainly take a few sessions to work through the material.

The topics on disk 1 begin with a quick tutorial on using the training program itself. Other headings present introductory material to help the new user start feeling comfortable around the machine, such as a look at the Apple IIe keyboard, and an overview of a complete IIe system.

Disk 2 outlines the editing capabilities of the system, including the cursor move-

## Learning To Program, continued...

son also discusses uses of peripheral slots, where game paddles, cassette cords and cables for video monitors are placed, the location of the power supply, and the location and use of the speaker.

The final lesson covers the Apple keyboard, explaining the difference between numeral 0 and letter O, what characters must be keyed in using the SHIFT key, the function of the CONTROL and ESCAPE keys, how the arrow and REPEAT keys are used, and the functions of the RESET and RETURN keys.

*Know Your Apple* makes a good introduction to the system. It gives you all the information you need to know to use your Apple without "getting technical." The graphics are very good, greatly enhancing the lessons.

### VHS or Beta Format

If you have a videocassette recorder, a better introduction to the Apple is *How to Use Your Apple II In Ten Easy Video Lessons*, published by Stoneware Incor-

---

## Television illustrates the material in moving color images.

---

porated and Kennen Publishing. The producers of this tape (VHS or Beta format) have managed to cram a comprehensive tutorial in a program only an hour and forty-three minutes long. This outstanding video program is almost as good as a classroom tutorial—with the added benefit that it is endlessly repeatable for those who don't absorb all the information it has to offer in one viewing.

The tape covers all the material mentioned on the Muse disk, but it does so more vividly thanks to television, which illustrates the material in moving color images. In addition to the basics, the tape shows you, in step-by-step fashion, how to set up your system and to ensure that all is well before you power up for the first time.

The tape also illustrates the various peripheral devices available for the Apple, including game paddles, printers, disk drives, phone modems and graphic tablets, among others. In addition, the tape illustrates the workings of the disk system, explaining what DOS is and how it helps the computer retrieve program data from a disk and how it saves program data to disk. In very graphic form it then demonstrates the procedure for booting a disk, examining the disk catalog and loading a program from the disk into the computer memory.

After a discussion of applications software (pre-programmed software packages like *VisiCalc* and *Apple Writer*), the taped program offers an elementary introduction to programming. The section covers some of the basic operating and programming commands including NEW, HOME, LIST, PRINT, GOTO, INPUT and END. It covers the difference between immediate and deferred execution of commands, native arithmetic functions of the Apple, linking print statements on the same line, automatic numerical ordering of program lines, loops, and creating variables in conjunction with input statements.

The best part of this package is that the videotape visually guides you through hands-on experience operating the Apple II and programming. Moreover, the novice is not rushed through the lessons. As you are prompted to perform various tasks on the Apple II, a pause is signaled at appropriate moments, using a special screen symbol and a series of beeps. At that signal, you hit the pause switch on the VCR and then complete the example as shown on the screen.

When a pause is signaled, the TV screen shows the program line being used in the exercise, allowing you to key it into the computer exactly as shown on screen. After each exercise, the video program carefully explains the point of the exercise and the functions of the various program commands.

The Stoneware video instruction package is a very powerful tool for learning. The approach to the subject is orderly, concise and friendly. This program is ideal for the average first-time computer user and a real blessing for anyone suffering from computer phobia. The video program demystifies the Apple II and systematically builds your confidence. The package lists for \$120 and is available in VHS and Beta formats. (Instructional video cassettes for the Apple III and the IBM PC also are available from Stoneware.)

An alternative videotape for the beginning computer user is *Computer Fundamentals and Beginning Programming*, produced by Avion Video Computers. The tape reviews most of the elementary operational functions covered in the Stoneware production and covers some of the simpler programming topics, including screen output and use of numeric and text variables. It seems to be a nice way to get your feet wet as a programmer, though the coverage is not comprehensive. The tape is available in VHS and Beta formats for \$69.95.

Assuming that you have mastered the basics of operating your Apple II, you should be ready and eager to tackle a

comprehensive beginner's programming tutorial so that you can start writing your own software programs. If you are still reluctant to work strictly from a manual and feel more comfortable having things explained to you, then a workable alternative would be an audio cassette.

### Audio Cassette

*The New Step by Step*, by Program Design Inc., mixes audio cassette instruction with disk-loaded tutorial material. The package, a tutorial for beginning programmers in Applesoft Basic, consists of four cassettes containing ten audio lessons, two disks with software to back up the audio lessons and a workbook.

To use the package, you run the disk program and play the audio tape simultaneously. The audio tape prompts you when and how to advance the computer program to the next block of material. Each of the ten audio lessons is extensively illustrated on the video screen.

The materials cover a wide and representative selection of basic programming skills. The course begins with some basic concepts, including the uses of the PRINT command with numbers and text, how the Apple does arithmetic, how and why

---

## Hands-on experience is indispensable in learning programming.

---

program lines are numbered, deletion of program lines, and error correction.

The package explains the creation and handling of variables, program loops, program counters and the library functions of Applesoft such as ABS (convert to absolute value), INT (convert to a whole number) and so forth. Next, the student learns how to access subroutines and return to the main program, to create and read data lines, to create FOR-NEXT loops, and to create and handle arrays of variables.

The concluding lessons give the student basic instruction on using the low-resolution graphic screen of the Apple. The last lesson offers a rare moment indeed, an explanation of scientific notation in a way anyone can understand.

Little quizzes designed to review and reinforce the concepts covered frequently interrupt the program. When it is time to answer review questions, you have the opportunity to stop the audio tape and take your time considering an answer. At the end of most of the lessons

# WHAT HAS IMMEASURABLE FIREPOWER...ATTACKING RIGILLIANS...ALTERED PERSPECTIVE SCROLLING...AND NO MERCY?



SYNAPSE SOFTWARE



**DIMENSION X™** by Steve Hales, the latest blockbuster from SYNAPSE SOFTWARE gives you a screenful of 3-D graphics, a desert sector map that's different every time, AND... no margin for error.

**DIMENSION X™** at software dealers everywhere, or AVAILABLE DIRECT FROM SYNAPSE ELITE, ONLY \$34.95 plus \$2 shipping and handling — SEND CHECK, MONEY ORDER OR VISA/MASTERCARD NUMBER TO SYNAPSE ELITE OR CALL (415) 527-7712.

For the Atari 400/800/1200



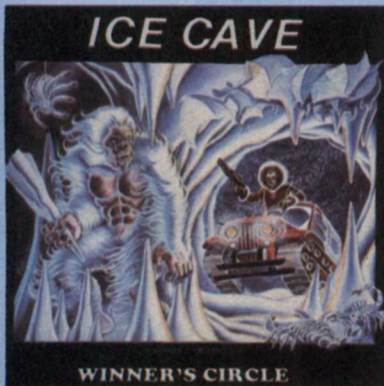
synapse  
SOFTWARE

5221 Central Avenue, Richmond, CA 94804 • (415) 527-7712

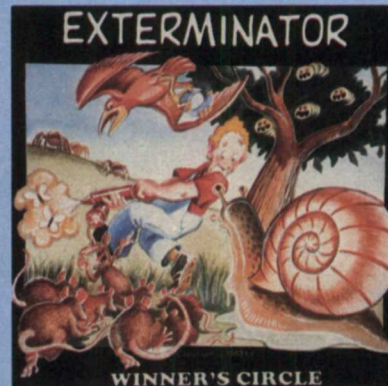
CIRCLE 213 ON READER SERVICE CARD

# APPLE POTENTIAL REALIZED

## ENTER THE WINNER'S CIRCLE



Ice Cave™



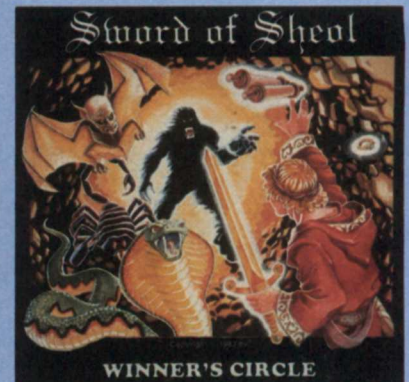
Exterminator™



Sanitron™



Sword of Sheol™



**You may not have realized it, but Apples have vast, untapped potential. Game software from Winner's Circle taps it ALL.**

Stunning 3-D graphics (the kind that just stand still in some games) are combined with advanced, HIGH SPEED ANIMATION routines for Dazzling, "LIVING PICTURE" action. And the game play has some teeth in it. ALL THE CHALLENGE YOU AND YOUR APPLE CAN HANDLE.

Available in disk for \$29.95. At your dealer. OR ORDER DIRECT. Send a check, or your VISA or MASTER-CARD number. Include \$2.00 shipping and handling. California residents add 6½% sales tax.

Apple is a registered trademark of Apple Computers, Inc.

**WINNER'S CIRCLE**

2420 Parker Street, Berkeley, CA 94704

CIRCLE 230 ON READER SERVICE CARD

## Learning To Program, continued...

there is a larger quiz reviewing the material. At the end of the last lesson, you are given two very thorough tests, which will help you gauge your overall progress.

Hands-on experience is indispensable in learning programming. *Step by Step* incorporates many opportunities for first-hand experience. At the end of each half lesson, you are referred back to the workbook, where the lesson material is briefly summarized and supported with a few exercises that you can work out on the computer. At the end of each lesson, the computer software frees the memory of the Apple so that you can complete the exercises.

This learning package represents a skillful blending of two very different media. None of the three principal elements of the package, the audio cassette, disk, or workbook, can stand alone, but together they make a surprisingly powerful tool for learning. The only real weakness in the package is that it is hard to find the starting points of specific lessons on the cassettes. The tapes are not labeled or indexed to show the location of the lessons (but you can make your own index by checking the numbers on the tape deck counter at the start of each lesson). Aside from this slight drawback, *Step by Step* comes highly recommended for beginning home users and for school use as well. The package, priced at \$89.95, is compatible with the Apple IIe. Similar packages are available for Pet and Commodore 64 systems.

### Self-Teaching Software

Now let's look at a tutorial which relies primarily on computer media—*How to Program In Applesoft Basic* by Hayden Software. This is true self-teaching software which runs on a 32K Apple II with Applesoft or Apple IIe. Two disks contain most of the text of twelve progressive lessons. When you boot the disk, a main program menu is displayed on your monitor. Options include a brief tutorial on use of the disk, six of the twelve lessons, and a quit option. Choosing a lesson brings up a table of contents that shows how the lesson is organized.

When you begin the lesson, you soon find that you may go at any speed with which you are comfortable. The text of the lessons is displayed only a few lines at a time. You may take as long as you like to absorb the material before you hit the space bar to signal that you are ready for the next block of text. If you wish to review material, you hit the ESC key and the Let's Talk option menu appears. You can quit the lesson, review the section, go to another section of the same lesson or see the lesson table of contents again.

Questions appear at various intervals

during the lessons, enhancing the learning. The questions are multiple choice; if you pick a wrong answer, additional text material reviews the concepts, guiding you to a better understanding of the material. This is a feature that a book cannot easily duplicate.

A manual that accompanies the software is divided into chapters corresponding to the lessons. Each chapter very briefly outlines the material in the

---

## ***School boards across the country have been hastening to buy batches of Apples, Ataris, TRS-80s and Commodores.***

---

appropriate lesson and ends with a series of exercises that you can perform on the computer. The disks include a memory erase option which clears computer memory for the exercises. You also have the option of using a scratch disk to save your exercise programs.

### More Comprehensive Than Audiotape

Evaluating the package, I found that it is more comprehensive than the audiotape. The Hayden disks cover all the material in the cassette tape package and have additional or expanded material on several subjects the tapes lacked. This includes material on functions and logical operators, functions available in handling string variables, using low-resolu-

tion graphics to create animation and to make graphs. The Hayden package also tackles high-resolution graphics, a subject not covered on the audio tapes.

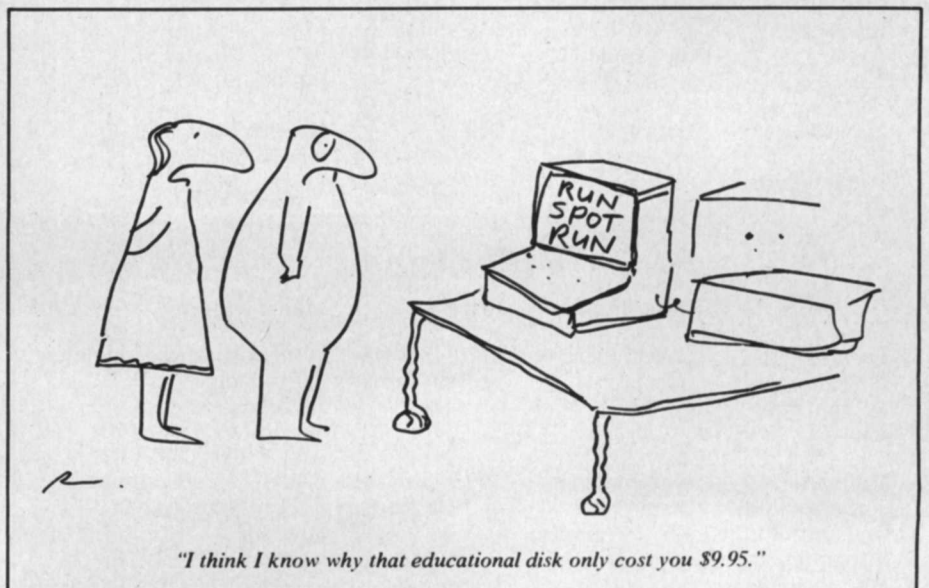
(In fairness, it should be pointed out that several crucial concepts are explained more clearly on the audio tapes than by the Hayden program. These topics include the creation and use of variables, how the Applesoft library functions work and how the Apple handles math. The tapes ignore hi-res graphics, but they explain scientific notation, which Hayden omits.)

One of the most valuable sections of the Hayden program is the last lesson, in which a nicely representative sample of all the programming skills hitherto developed are used in a practical calendar program which displays any month from January, 1900 to December, 1999. The lesson shows how the functions of the program are logically organized and describes in detail the construction of the routines.

*How to Program in Applesoft*, including the disks and the workbook, costs \$49.95.

Approaching the subject matter in a way similar to the Hayden package, the *Apple II Microcomputer Workbook* and teaching disks are offered by Sterling Swift Publishing. The format is a series of lessons loaded from disk, and supported by a workbook with supplemental exercises.

The principal difference in approach is that the lessons loaded from disk require more hands-on involvement of the learner. Instead of answering multiple choice questions, you must develop your own answers. For example, when asked to write a program line to display the word HELLO on screen, you must write PRINT "HELLO" to register as correct.



## Learning To Program, continued...

The value of these questions becomes more apparent when you delve into more advanced concepts such as arrays, string variables, FOR-NEXT loops and library functions.

The subject matter is strictly beginner's level. High-resolution graphics are not covered, and low-resolution graphics are not examined in depth. Space on the disk, which could have been better used to explain some of the subject matter in greater depth, is used instead to discuss applications software.

One real strength of this package is the excellent workbook that accompa-

nies it. Each lesson from the disk is extensively supported by many workbook exercises. The questions in the book are not perfunctory; they challenge as they drill concepts and test knowledge. The nature of the questions seems to indicate that the authors of the program, James L. Poirot and Donald Alan Retzlaff of North Texas State University, were thinking of the classroom when they designed this package. If the home or business learner overlooks the tone of the exercise questions, the program works fine as a self-teacher.

This instructional package comes in

two flavors—disk and cassette; both list at \$69 (plus \$5.95 for the workbook). Other versions include tutorials for the Apple IIe, Texas Instruments, Commodore 64 and TRS-80.

### Classroom Packages

Let's digress for a moment and look at classroom learning. Teachers have special problems. School boards across the country have been hastening to buy batches of Apples, Ataris, TRS-80s and Commodores for junior high and high school computer literacy programs often without providing texts and teaching materials. Finding instructional materials that will work in the classroom is a difficult task for teachers. The materials for children, as for adults, have to suit varied learning styles.

Well, here are some answers. First, any of the software packages discussed will adapt well for school use on the junior high and high school levels. There are also, in increasing numbers, teaching packages specifically designed for classroom use.

A representative example of a classroom package is *Discover Basic—Problem Solving With the Apple II Computer*, published by Sterling Swift and created by Rick Thomas, a programming teacher at Junction City High School, Junction City, OR. Like *How to Program* from Hayden and the *Microcomputer Workbook*, Thomas's program blends materials loaded from disk with a written text. The difference is that the written word has a decided advantage over the electronic medium. The factual material is to be communicated by the teacher and through the workbook, not through the computer. The computer serves only as a medium for completing assigned exercises.

The role of the disk material is to provide a variety of demonstration programs that a student or small group of students can load, run and—most important—modify as the workbook or instructor suggests. In the teacher's guide to the learning package, Thomas calls it a learning by discovery package. The student, armed with the appropriate concepts, is given a chance to experiment, to observe the results and to write his observations. Eventually the student is able to predict the results to be obtained by writing specific program statements. At that point, the student is programming.

The material appears to be just right for an intensive semester at the high school level or for a year's work for junior high children. It covers screen output commands, creating and using variables, counting, error checks, IF-THEN conditionals, loops, character strings, library functions, arrays, and

## Apple II Software

Name	Description	Price	Manufacturer
Apple Basic: Data File Programming	Disk supplements text of same name for quick learning	\$19.95 (manual costs \$12.95)	John Wiley & Sons 605 Third Ave. New York, NY 10158
Cdex Apple IIe Training Program	Fine disk-based tutorial	\$59.95	Cdex Corporation 5050 Camino Real Los Altos, CA 94022
The New Step by Step	Media are mixed masterfully for maximum teaching power	\$89.95	Program Design Inc. 11 Idar Ct. Greenwich, CT 06830
Apple II Microcomputer Workbook	Excellent programming tutorial	\$74.95 (including workbook)	Sterling Swift Publishing P.O. Box 188 Manchaca, TX 78652
Discover Basic—Problem Solving With The Apple II Computer	Perfect for junior and senior high programming classes	\$74.95 (teacher guide and disks) \$5.95 (student workbook)	Sterling Swift Publishing P.O. Box 188 Manchaca, TX 78652
Know Your Apple	A first look at the Apple II	\$34.95 (IIe version-\$24.95)	Muse Software 347 N. Charles St. Baltimore, MD 21201
How To Program in Applesoft Basic	Excellent programming tutorial	\$49.95	Hayden Software 600 Suffolk St. Lowell, MA 01853

## Videotape

Name	Description	Price	Manufacturer
How to Use Your Apple II In Ten Easy Video Lessons	Comprehensive tutorial	\$120, in VHS or Beta formats	Stoneware Microcomputer Products 50 Belvedere St. San Rafael, CA 94901
Computer Fundamentals and Beginning Programming	Coverage not comprehensive	\$69.95, in VHS or Beta formats	Avion Video Computers 22916 Lyons Ave. Suite 2B Newhall, CA 91321

low-resolution graphics. Combing through the listings of the demonstration programs, modifying them and writing new programs, the student should get a thorough grounding in the basics of Basic.

*The Teacher's Guide* with demonstrations and solutions disk lists for \$74.95. The student workbook costs \$5.95.

### Writing Software

The goal of learning to program is to acquire the ability to write software that solves a specific problem or performs given tasks. Having the basic skills, a beginning programmer may still find it difficult to start from scratch in creating a sophisticated applications program. Though I found many tutorials in print and mixed media on programming basics, I found few books focusing on narrower programming tasks.

One self-teaching guide, combining a printed manual and a disk is *Apple Basic: Data File Programming* by LeRoy Finkel and Jerald R. Brown, published by John Wiley & Sons. As the title implies, the book focuses on creating files of numerical and text data by writing programs to enter that information, organize it and then access it as necessary. The course reviews the fundamentals of Basic, which you should be able to assimilate using one of the tutorials. It covers data entry and error checking, the creation of sequential files and programs, and the creation and use of random access files.

The authors are well aware of the value of hands-on instruction. Most of the book is programming exercises, in written form and, with the Apple II, designed to reinforce concepts and get the learner thinking.

On examining this course, we discover that we have come almost full circle, back to dependence on the written word. The subject matter is presented primarily through the written manual. In fact, the book can fulfill its teaching purpose perfectly well without the supplementary disk which contains no instructional material. The disk simply loads program examples from the text as a timesaving alternative to keying them manually from the book. It runs on a 32K Apple II with Applesoft.

### Summary

These are only a few of the teaching packages available to you as you approach your Apple II for the first time. Similar tutorials are available in ever-increasing numbers for the other major microcomputer systems.

How you choose an instructional package for yourself should depend on three basic points: First, what you want your computer to do for you? If you

want to run only preprogrammed applications software and games, leave programming courses alone for now and choose instead a course that teaches you the basics of computer use.

Second, what medium do you feel most comfortable with? Whether you believe you can learn best from a book or whether you want to learn through video instruction or audio tapes, try to skim through or preview the learning package before you buy.

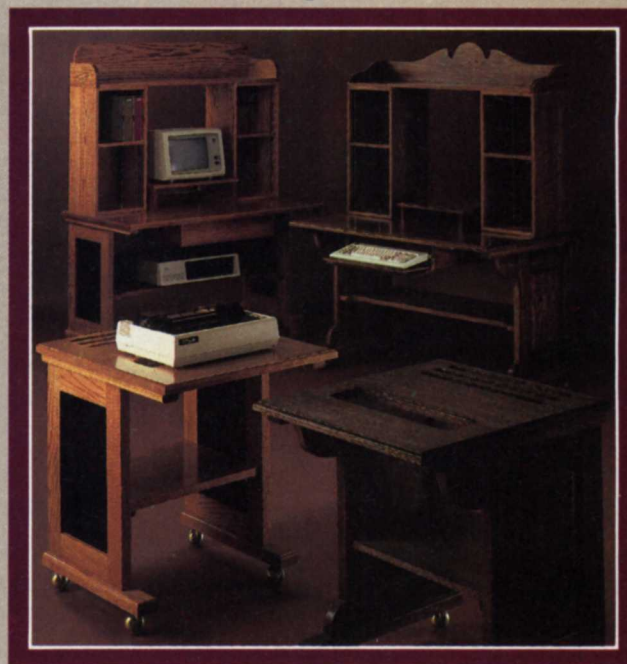
Finally, does the learning package

give you a chance to get your hands on the computer and work with it? No amount of text, written exercises, pictures or sounds can replace the experience of actually testing your programming knowledge on the computer.

Few learning experiences are as gratifying as writing a computer program and running it, seeing that it works error free. That is the moment you can say for the first time, "I'm a programmer." ☐

## FineTech Presents THE WOODBURY SERIES.

Because your home computer furniture shouldn't look like computer furniture.



Computer furniture. The phrase alone brings to mind cold steel legs and pressboard veneer. But as our computer age swiftly moves into the home, FineTech realizes the need for custom-made fine furniture to house the personal computer. Thus the handcrafted solid oak designs of the Woodbury Series.

Choose either our traditional or contemporary design, in your preference of three hand-stained finishes. Each making its mark as fine furniture to even the

most discriminating tastes, yet you'll find that the Woodbury Series is priced *very* affordably. Call or write for our full color complimentary brochure and specifications. Because there's no reason for your computer furniture to look like computer furniture.

**FineTech**  
FURNITURE, INC.

P.O. Box 280 Woodbury, TN 37190  
615/765-5021

Yes, I am interested in the Woodbury Series.  
Please send me your brochure.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_

FINETECH FURNITURE, INC.  
P.O. Box 280 Woodbury, TN 37190

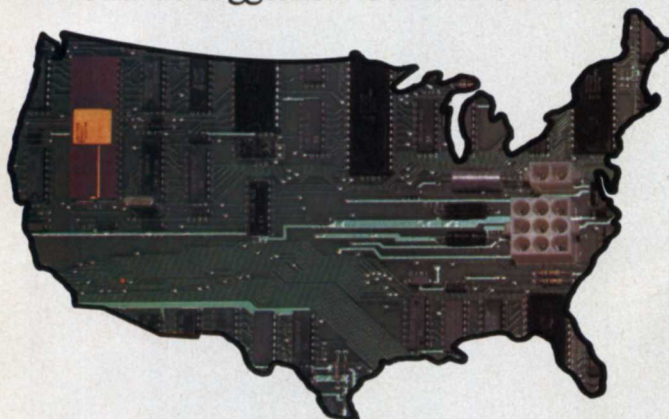
# Xerox Service Centers.

## The personal computer back-up system you've been looking for.

Unfortunately, most people find out the hard way that there's one question even a personal computer can't answer.

Where can you take it for service?

We have a suggestion. Come to one of our



new Xerox Service Centers. We have 82 nationwide. And we're multiplying faster than software programs.

Right now we're equipped to handle Osborne™ Computers, Epson™ MX Series Printers, Pied Piper™ Computers, Morrow Designs Micro Decision™ Computers, Corona Data Systems Computers, Enter Sweet Pea™ Color Plotters, Cameo Electronics Winchester Disk Drives, Okidata Microliner™ and Pace-mark™, and Amdek™ products. In addition to a number of Xerox products like the 820 Personal Computer and Diablo™ Printers. But in the future, we'll be servicing even more brands of personal computers and related items.

Our service people have to undergo one of the toughest training programs in the industry. Including plenty of

hands-on experience and intensive study of computer technology.

Then we put them through the specialized courses on other brands.

We've even provided a back-up system to our back-up system with a nationwide "hot line" to our Xerox Technical Support Centers. So in the unlikely event your bugaboo baffles our local whiz, there's extra help close at hand.

And we keep our parts departments well stocked. Which means your problem can be fixed a lot faster than you'd imagine.

But one of the best things about bringing\* your equipment to us is that you get Xerox quality service at a very affordable price.

So come in and see us. Or contact the Xerox Five Star Service Dealer in your area for more information.

Because 82 new Xerox Service Centers are not only a nice step forward for us. They're a great system for you to fall back on.

Visa, MasterCard and American Express Cards accepted.

\*Pick-up and delivery available.

## Xerox Service Centers.

**Alabama:** Birmingham, 167-A Citation Court, (205) 945-1280.

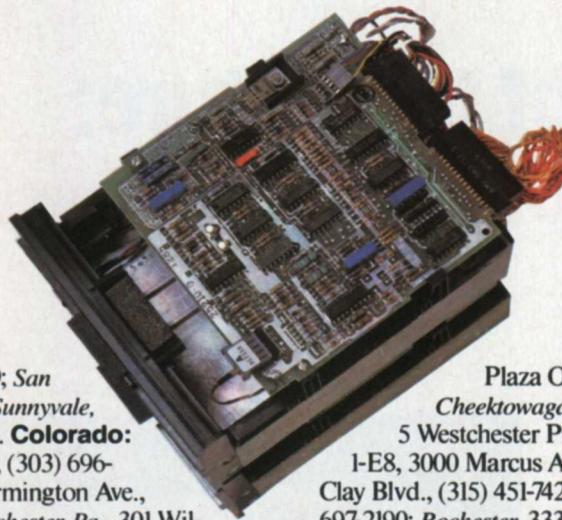
**Arizona:** Tempe, Suite 101, 2109 S. 48th St., (602) 967-1922.

**California:** Alhambra, 614 South Marengo, (213) 289-0174; Anaheim, 232 W. Cerritos Ave., (714) 776-8143; Carson, Suite E, 20630 Leapwood, (213) 516-6650; Chatsworth, 20802 Plummer St.,

(213) 709-0226; Sacramento, 4247 S. Market Court, (916) 920-2275; San Diego, Suite N, 7343 Ronson Rd., (619) 569-1212; San Francisco,



# XEROX



Suite B, 1555 Burke Ave., (415) 821-7719; *San Leandro*, 1981 Adams, (415) 635-9300; *Sunnyvale*, #6, 540 Weddell Drive, (408) 734-2540. **Colorado:** *Denver*, Suite 201, 8200 E. Pacific Place, (303) 696-8966. **Connecticut:** *Hartford*, 593 Farmington Ave., (203) 236-2381. **Delaware Area:** *Westchester, Pa.*, 301 Wil-lowbrook Lane, (215) 431-0533. **Florida:** *Altamonte Springs*, 716 North Lake Blvd., (305) 830-8109; *Ft. Lauderdale*, #502, 1500 N.W. 62nd St., (305) 491-3202; *Jacksonville*, Unit #4, 3035 Powers Ave., (904) 731-7218; *Miami*, 6908 N.W. 72nd Ave., (305) 887-2711; *Tampa*, Suite 6, 6201 Johns Rd., (813) 886-0779. **Georgia:** *Atlanta*, Suite 10, 2215 Perimeter Park Drive, (404) 458-1016. **Hawaii:** *Honolulu*, Suite 104, 627 South St., (808) 526-0885. **Illinois:** *Chicago*, 165 N. Canal St., (312) 559-9440; *Elk Grove Vil-lage*, 2216 Landmeier Rd., (312) 437-3180; *Lombard*, 436A Eisenhower Lane, (312) 953-1113; *Springfield*, 2036 S. MacArthur, (217) 523-1007. **Indiana:** *Indianapolis*, 5335 W. Minnesota St., (317) 241-2888.

**Iowa:** *Des Moines*, 700 E. 4th St., (515) 282-8700.

**Kansas:** *Overland Park*, 6383 W. 110 St., (913) 381-9819; *Wichita*, 7804 E. Funston, (316) 685-4731. **Kentucky:** *Louisville*, 10308 Bluegrass Parkway, (502) 499-7224. **Louisiana:** *Baton Rouge*, Suite K, 10466 Airline Highway, (504) 291-5974; *Harahan*, Suite F, 550 Wholesalers Parkway, (504) 733-1201.

**Maryland:** *Hunt Valley*, 100 Lakefront Drive, (301) 667-8711; *Lanham*, 9730A-I George Palmer Highway, (301) 459-3973; *Rockville*, 12288 H. Wilkens Ave., (301) 468-8870. **Massachusetts:** *Braintree*, 190 Forbes Rd., (617) 848-5750; *Woburn*, 248 W. Cummings Park, (617) 938-0845. **Michigan:** *Lansing*, Suite 7, 6810 South Cedar, (517) 694-3350; *Troy*, Suite 7, 1270 Rankin, (313) 583-2935. **Minnesota:** *Edina*, 3650 Hazelton Rd., (612) 920-4472. **Mississippi:** *Jackson*, 870 Foley St., (601) 948-6302. **Missouri:** *St. Louis*, 11984 Dorsett Rd., (314) 991-2106. **Nebraska:** *Omaha*, 11129 Mill Valley Rd., (402) 493-0387. **New Jersey:** *Lodi*, 300-1B Rt. 17, (201) 777-4441; *Monmouth Junction*, Bldg. 1, 248 U.S. Rt. 1, (201) 329-2050; *Whippany*, 145 Algonquin Park-way, (201) 428-1275. **New Mexico:** *Albuquerque*, Suite D, 5659 Kircher Blvd., (505) 344-3563. **New York:** *Albany*, Pine West

XEROX®, 820 and Diablo® are trademarks of XEROX CORPORATION.

CIRCLE 231 ON READER SERVICE CARD

Plaza One, Washington Ave Ext., (518) 869-9082; *Cheektowaga*, 198 Sugg Rd., (716) 634-2993; *Elmsford*, 5 Westchester Plaza, (914) 592-4454; *Lake Success*, Suite 1-E8, 3000 Marcus Ave., (516) 437-1134; *Liverpool*, 7150 Henry Clay Blvd., (315) 451-7420; *New York*, 405 Lexington Ave., (212) 697-2190; *Rochester*, 333 Metro Park, (716) 424-4010. **North Carolina:** *Charlotte*, 2838 G Interstate 85 S., Carolina Center, (704) 399-1523; *Raleigh*, 5225 North Blvd., #1 N. Commerce Center, (919) 876-1610. **Ohio:** *Akron*, 2650 S. Arlington Rd., (216) 644-3251; *Cincinnati*, 4814 Interstate Drive, (513) 874-0884; *Cleveland*, Technology Plaza, 5267 E. 98th St., (216) 587-1546; *Columbus*, 3711 Corporate Drive, (614) 895-3033. **Oklahoma:** *Oklahoma City*, 2122 South Meridian, (405) 682-5030; *Tulsa*, 4725A South Memorial Drive, (918) 665-0811. **Oregon:** *Tigard*, 10110 S.W. Nimbus Ave., B-9, (503) 684-1152. **Pennsylvania:** *Harrisburg*, 806 S. 29th St., (717) 564-2602; *King of Prussia*, Suite C, 1006 W. 8th Ave., (215) 337-4486; *Philadelphia*, Suite H&I, 9140 Academy Rd., (215) 331-0999; *Pittsburgh*, 601 Holiday Drive, (412) 921-8202. **Tennessee:** *Memphis*, Suite 143, 1835 Nonconnah Blvd., (901) 346-2211; *Nashville*, 1854 Airline Drive, (615) 883-5102. **Texas:** *Austin*, #112, 7950 Ander-son Square, (512) 451-6263; *Dallas*, Suite 104, 1625 W. Mockingbird Lane, (214) 630-6647; *Fort Worth*, 3273 Crabtree St., (817) 626-8243; *Houston*, Suite 220, 7280 Wynnwood, (713) 862-1784; *Houston*, 3642 Westchase Drive, (713) 789-3070; *San Antonio*, Suite 112, 2411 Northeast Loop 410, (512) 655-0085. **Utah:** *Salt Lake City*, 3697 W. 1987 S., (801) 973-7316. **Vir-ginia:** *Fairfax*, 2731B Prosperity Ave., (703) 698-7477; *Richmond*, 8707 W. Broad St., (804) 747-0275; *Virginia Beach*, 1448 Air Rail Ave., (804) 464-4752. **Washington:** *Renton*, 266 S.W. 43rd St., (206) 251-9155. **West Virginia:** *Charleston*, 523 Central Ave., (304) 342-8015. **Wisconsin:** *New Berlin*, 2995 South Moreland, (414) 784-3690.



# The House of the Future: Complete Computer Control

**Catrien Ross Laetz**

*Most personal computer enthusiasts dream of the house of the future. If you are one of them, compare this description of a full scale, built-from-scratch, futurist's dream house with the following review of the HomeBrain in which Glenn Hart puts very similar features and capabilities within reach of most micro owners.*

As Don Sheppard punches his special code into the electronic keypad at the entryway, a monotone computer voice says, "Welcome-home-Don-come-right-in." The front door then glides open.

Once inside, Don can rely on the computer to lock the door behind him, turn the lights on, and adjust the room temperature to the most comfortable level. In the kitchen he can use the computer terminal to check the day's messages, enter tomorrow's appointments and retrieve a favorite recipe. After dinner, if



*Rising out of the Arizona desert, the copper trimmed structure of the House of the Future houses a unique system for complete computer control of the home.*



he feels like relaxing, he can put his feet up in the entertainment room and play a leisurely game of computer chess. He can also catch up on computer educational programs on the large color TV. When he finally goes to bed he can rest easy, because the computer will function as a security system that will alert his sleeping form to intruders, break-ins, or fire.

Sheppard is not really the resident of this futuristic home. He is, however, its computer program manager—the man

Catrien Ross Laetz, 2030 S. Dromedary Dr., Tempe, AZ 85282.

*Triangle motifs and courageous color schemes are echoed throughout the bright, light interior.*

August 1983 © Creative Computing

apple  
discount  
software

# CALSOFT

Personal—Entertainment—Business  
SOFTWARE



Low Discount Prices/15% to 25% Discount off List Price  
Fast Convenient Service/Same day shipping on most orders  
Large Selection of Software/Call or Write for our FREE Catalog!

We have all the latest  
software—ASK US!

ATARI, IBM PC, CP/M:  
send for  
FREE catalog!

**Call Toll Free: (800) 423-5290 In California: (213) 991-9641**

## BEAGLE

	List Price	Our Price
DOS Boss .....	24.00	20.40
Utility City .....	29.50	25.05
Apple Mechanic .....	29.50	25.05
Pronto DOS .....	29.95	25.45
★Double Take .....	34.95	26.20

## BPI GENERAL LEDGER

~~395.00~~ 316.00

## BPI SYSTEMS

Accounts Receivable .....	395.00	316.00
Accounts Payable .....	395.00	316.00

## BRODERBUND

David's Midnight Magic .....	34.95	29.70
★The Arcade Machine .....	59.95	44.95
Choplifter .....	34.95	29.70
Serpentine .....	34.95	29.70
Sea Fox .....	29.95	25.45
AE .....	34.95	29.70
★Bank Street Writer .....	69.95	52.45
Gumball .....	29.95	25.45
Lode Runner .....	34.95	29.70

## CONTINENTAL

★Home Accountant .....	74.95	56.20
CPA Modules #1-4 (each) .....	250.00	199.95
★FCM .....	99.95	74.95

## EDU-WARE

Rendezvous .....	39.95	33.95
Prisoner 2 .....	32.95	28.00
★Algebra 1-4 (each) .....	39.95	29.95
Algebra 5 & 6 .....	49.95	42.45
Fractions/Decimals (each) .....	49.00	41.65
PSAT/SAT Word Skills (each) .....	49.00	41.65

## INFOCOM

★Zork I, II, III (each) .....	39.95	29.95
Deadline .....	49.95	42.45
★Starcross .....	39.95	29.95
Suspended .....	49.95	42.45

## MICROSOFT

★Multiplan .....	275.00	206.25
Typing Tutor II .....	24.95	21.20
★TASC Compiler .....	175.00	131.25
RAM Card .....	99.95	84.95

## PENGUIN

★Complete Graphics System .....	69.95	52.45
★Graphics Magician .....	59.95	44.95
Special Effects .....	39.95	33.95
Spy's Demise .....	19.95	16.95
Transylvania .....	19.95	16.95
Crime Wave .....	19.95	16.95

## SIERRA ON-LINE

	List Price	Our Price
Wizard & the Princess .....	32.95	28.00
★Ulysses .....	34.95	26.20
★Dark Crystal .....	39.95	29.95
Cross Fire .....	29.95	25.45
★Screenwriter II .....	129.95	97.45
★Screen Writer Professional .....	199.95	149.95
★Ultima II .....	59.95	44.95
Frogger .....	34.95	29.70
The Artist .....	79.95	67.95
General Manager .....	229.00	183.20
Jawbreaker .....	29.95	25.45
Learning with Leeper .....	34.95	29.70
Dragon's Keep .....	29.95	25.45
Bop-a-Bet .....	25.95	22.05
Troll's Tale .....	29.95	25.45
Sammy Lightfoot .....	29.95	25.45

## SIR-TECH

Wizardry .....	49.95	42.45
Knight of Diamonds .....	34.95	29.70
Legend of Lylygamyn .....	39.95	33.95
Star Maze .....	34.95	29.70

**FREE DISKETTE**  
with each order over \$50.  
Just mention this ad.

## SOFTWARE PUBLISHING

★PFS .....	125.00	93.75
★PFS: Report .....	125.00	93.75
PFS: Graph .....	125.00	106.25

## SPINNAKER

★Snooper Troops #1, #2 (each) .....	44.95	33.70
Story Machine .....	34.95	29.70
Face Maker .....	34.95	29.70
Delta Drawing .....	59.95	50.95

## STONEWARE

★DB Master .....	229.00	171.75
DB Master Utility Pak #1 .....	99.00	84.15
DB Master Utility Pak #2 .....	99.00	84.15

## TG PRODUCTS

★Joystick .....	59.95	44.95
Game Paddles .....	39.95	33.95
★Select-a-Port .....	59.95	44.95

## ULTRASOFT

Mask of the Sun .....	39.95	33.95
★Serpent's Star .....	39.95	29.95

## XEROX

Sticky Bear Bop .....	39.95	33.95
Sticky Bear Numbers .....	39.95	33.95
Sticky Bear ABC .....	39.95	33.95

## SIRIUS SOFTWARE

	List Price	Our Price
★Blade of Blackpoole .....	39.95	29.95
The Joyport .....	49.95	42.45
★Type Attack .....	39.95	29.95
Wavy Navy .....	34.95	29.70
★Repton .....	39.95	29.95
Critical Mass .....	39.95	33.95
Fowl Play .....	39.95	33.95

## MERLIN

~~64.95~~ 48.70

## SOUTHWESTERN

★Ascii Express Professional .....	129.95	97.45
Routine Machine .....	64.95	55.20
Munch-a-Bug .....	49.95	42.45
SDS Combo .....	119.95	101.95

## STRATEGIC SIMULATIONS

Napoleon's Campaigns .....	59.95	50.95
★Road to Gettysburg .....	59.95	44.95
Guadalcanal Campaign .....	59.95	50.95
The Cosmic Balance .....	39.95	33.95
★Germany: 1985 .....	59.95	44.95
Battle for Normandy .....	39.95	33.95
★Galactic Adventures .....	59.95	44.95
Bomb Alley .....	59.95	50.95
Epidemic .....	34.95	29.70
Fighter Command .....	59.95	50.95
RDF: 1985 .....	34.95	29.70
North Atlantic '86 .....	59.95	50.95
Knights of the Desert .....	39.95	33.95

## VISICORP

★Visicalc .....	250.00	193.75
★Visitrend/Visiplot .....	300.00	225.00
★Visifile .....	250.00	193.75

We also carry complete lines from the  
following companies:

ASHTON-TATE • AVANTE-GARDE  
BUDGECO • DATAMOST  
DATASOFT • HAYDEN  
HAYES • KRAFT  
KENSINGTON • LEARNING CO.  
LOTUS • MICROLAB  
MICROPRO • PEACHTREE  
SILICON VALLEY • MUSE  
ODESTA • QUALITY  
SOFTWARE DIMENSIONS  
SATURN • SENSIBLE  
SUBLOGIC • SYNERGISTIC  
TERRAPIN • VIDEX

If you don't see it, Ask Us!

# CALSOFT

346 N. Kanan Rd. #103  
Agoura, CA 91301

**Call Toll Free: (800) 423-5290 In California: (213) 991-9641**

We accept Mastercard & Visa (include # and Expiration Date), check, COD (\$1.50 extra), or Money Order. California residents add 6% sales tax. Include \$2.00 for shipping (UPS Blue Label \$3.00, Canada \$6.00, other foreign countries 10% of order - minimum \$10.00).

★ Sale prices are through August only! Prices subject to change without notice.

## House of the Future, continued...

in charge of this exciting Arizona project involving complete computer control of the home. The project—the only one of its kind—is called, appropriately enough, the House of the Future.

Opened in 1980, the House of the Future was designed to be a showcase for state-of-the-art electronic innovations. Since then it has served as a "living laboratory" for the latest in computer technology, manufacturing techniques and energy management methods. Today, it continues as a test bed for the newest ideas in computer design and application for tomorrow's world.

The structure itself is a 3100 square foot, copper-trimmed prism rising out of

---

### ***The only permanent resident of the House of the Future is the computer.***

---

the Arizona desert. Computer-controlled solar collectors on the south face of the house provide 75% of the heating and 95% of the domestic hot water needs. Large translucent fiberglass panels (used instead of windows) are also regulated by microprocessors.

Inside, the house is as startling as it is outside. Sharply angled rooms display a riot of primary colors. A triangle motif, based on an "Indian Jewellery" theme, is echoed throughout, in colors of pink, orange, green and turquoise. A lush atrium and fountains surround the conversation pit, where a heatilator fireplace reaches up to the 32-foot ceilings.

For the moment, the only permanent resident of the House of the Future is the computer. That monotone voice which greets visitors belongs to a unique, Motorola-designed five-unit computer network which serves as the nerve center of the building. Based on Motorola's MC6800 microprocessor, the computer does much more than greet visitors and open doors, however. The microcomputer system is actually a sophisticated home manager which monitors and controls everything from outside temperature to what's cooking in the oven.

As the "living" organism within this "living laboratory," the computer responds to internal and external stimuli and makes decisions and adjustments accordingly. It measures temperature and decides whether or not to open or close cooling windows, for example. It also determines the humidity level of the

air (in order to turn on a special evaporative cooler). And it maintains different temperatures at different times of the day in different parts of the house, thereby meeting heating and cooling needs in the most efficient manner.

As far as technological know-how is concerned, the Home Management System in the house is considered a pioneer in the field of computer control of the home. Although it was designed two years ago, it uses a distributed processing network, a concept which is at the forefront of computerized industrial application today. Such a network minimizes response time from input to action and preserves system integrity under failure conditions. The system also uses such things as table managers to maintain and act on tables of data relating to energy and security control throughout the home.

The main problems confronting the average homeowner desirous of controlling his home by computer are those of wiring the house and converting control signals—actually finding a way for the computer to communicate with home appliances. In the House of the Future these problems have been resolved successfully. Wiring was taken care of because the computer was installed as the house was being built. Signal communication is achieved through digital input/output boards which sense switch closures of door keypads, wall switches, smoke detectors and motion detectors. In addition, an analog board handles analog input flow, temperature and humidity sensors, and watt transducers.

The display/keyboard card was custom designed. It provides alphanumeric and graphic displays in eight colors and is based on the MC6874 video display generator and the MC1372 modulator. These devices are ideal for homeowner applications such as TV games and personal computers.

At the primary microcomputer node, located in the entertainment room, there is a screen printer and a dual floppy drive (Motorola EXORDisk). The entertainment room node also has a readout display, as does the master bedroom node and the kitchen node. The

---

### ***All software for the House of the Future computer is written in Motorola's high-level language, MPL.***

---

fourth microcomputer node is in the laundry room; the fifth is just outside the entertainment room.

All software for the House of the Future computer is written in Motorola's high-level language, MPL. It permits structured programming and allows software to be developed in a very short period of time. The software consists of an operating system package and an applications package which reside in each of the five microprocessor nodes.

The Home Management System of the House of the Future controls five main areas—information, security, environment, electrical load switching, and energy management.



*A computer display terminal is conveniently located in the kitchen of the House of the Future.*

#### **Information**

As an information manager the computer can be used for the storage and retrieval of text and graphic information. Everything from addresses, recipes, vital records, and upcoming events can be stored under a file name on a floppy disk. In addition, there is a special type of information which is retrieved by date rather than name. This "desk calendar" mode functions as a convenient family activity planner.

#### **Security**

The House of the Future has no traditional locks. The security measures used are entirely dependent on the innovative computer system. At the front

# Nightraiders

Fantastic  
action game  
for Atari\*

The elite corps known as the Nightraiders are trying to bring freedom to a conquered earth. Since they are few in number, compared to the enemy, they must operate under the cloak of darkness. As the group's leader, your mission is to fly over enemy strongholds . . . identify targets of opportunity and destroy them thoroughly.

While the invaders cannot mount an air attack after the sun has set they do have weapons of awesome power . . . weapons which relentlessly track your flightpath and anticipate your movements.


Success does not come easy. You must be able to maneuver like the crack of a whip . . . accelerate and decelerate in and out of hyperdrive . . . while carefully lining up the targets for your twin ion bombs. And always keep an eye on the special radar screen which spots enemy action for you.

Become a Nightraider and meet the most fascinating challenge of your space career!

**\$29.95/Atari\***

**400/800 with  
Disk Drive  
and Joystick**

At your computer store, or from:

 **DATAMOST**

8943 Fullbright Ave.,  
Chatsworth, CA 91311

VISA/MASTERCARD accepted. \$2.00 shipping/handling charge. (California residents add 6 1/2% sales tax.)

\*Atari is a registered trademark of Atari, Inc.

DAY  
MUST TURN TO NIGHT  
BEFORE MANKIND  
DARES TO FIGHT

CIRCLE 139 ON READER SERVICE CARD

That's what you get with the LNW80 Model 2—undoubtedly the most versatile, powerful and fully equipped microcomputer in its class today. A machine so superior in concept and design, that it will define the standards of microcomputer performance for years to come.

## VERSATILITY

The LNW80 2 performs wonders with the most complete library of software available to any microcomputer on the market today. Every LNW80 2 comes complete with this outstanding library of Business Software. **LNW SMALL BUSINESS AND PROFESSIONAL ACCOUNTING SERIES™** General Ledger, Accounts Receivable, Accounts Payable, Payroll; **ELECTRIC SPREADSHEET™**; **ELECTRIC PENCIL™ WORDPROCESSOR**; **MICROTERM™ MODEM PROGRAM**; **CHART EX™ HIGH RESOLUTION BUSINESS GRAPHICS CHARTING PROGRAM**; **CP/M 2.2™**; **DOSPLUS™**; **LNW-BASIC™**; **MICROSOFT BASIC™**. In addition to a comprehensive line of LNW80 2 Software, it is also fully compatible with software from TRS80® (Models 1, 3, 4), CP/M® and Cromemco® worlds—a capability which gives you access to the most extensive and mature libraries of business, scientific, engineering and entertainment software applications. So no matter how far you expand into user applications, the LNW80 2 will expand right along with you.

## POWER

The LNW80 2 performs miracles with the computing power of 96K RAM (standard) of user memory matched with a mass storage capability which handles 5¼" floppy disks and 5¼" hard disk drives. And while the unit comes with build-in

controllers for 5¼" and 8" floppy disks (single/double sided, single/double density, up to 4.5 Megabytes capacity), the LNW80 2 also gives you the unique ability to read and write diskettes from a greater variety of other popular computers than does any other microcomputer. So regardless of how big you grow, you will never end up with thumb-twiddling down time while you expand to a more powerful system. The LNW80 2 will always have enough muscle to handle your biggest and toughest jobs.

## FULLY EQUIPPED

The LNW80 2 was developed to anticipate the needs of both expansion and compatibility. So the computer was designed with enough built-in features to keep you from having to spend a small fortune as you move down the road to higher levels of user sophistication. Standard features include high and low resolution graphics in both color and black-and-white, an asynchronous serial communication channel, and a wide variety of tape, printer, monitor and hardware expansion ports. In addition, the LNW80 2 contains an array of quality construction features that fully justify its remarkable one-year limited warranty.

So if you're looking for a microcomputer that will satisfy your performance needs as you grow and develop, take a long, hard look at the LNW80 2. It's the one microcomputer built to meet the challenges of tomorrow—for a long time to come. For more information and the name of the dealer nearest you, write or telephone:

**LNW Computers**

2620 Walnut, Tustin, California 92680

Telephone: 714/544-5744



# STATE-OF-THE-ART ENGINEERING STATE OF TOMORROW PERFORMANCE.

## LNW COMPUTERS

CIRCLE 158 ON READER SERVICE CARD

## House of the Future, continued...

door, the computer activates a solenoid which glides open the panel when the correct personal code is entered into the keypad. The security function can also cycle lights throughout the rooms when residents are away from home. In the case of fire, the computer sets off smoke detectors and calls out Fire!, Fire! When an intruder is sensed, alarms are sounded, lights come on, and the computer pinpoints exactly where the intrusion has occurred. Closed circuit TV cameras continually survey the front entrance as well as pool and patio areas.

### Environment

So that the computer can properly control the environment, the House of the Future is divided into three zones, each of which is treated as if it had its own thermostat. The homeowner thus uses heating and cooling only where it is desired. For example, at night, the bedrooms only can be heated or cooled, without having to heat up or cool down the entire house.

The computer system senses the temperatures and then reacts by choosing the heating or cooling equipment that will respond to climactic conditions in the most energy-efficient manner. If the central part of the house is too warm, the computer will first check the outside temperature to determine whether doors and window panels should be opened. If so, the computer opens appropriate panels and doors to let cooler air inside. If the outside air is too warm, the system



*The master bedroom was designed with a built-in video display terminal as part of the furnishings.*

might choose to turn on the evaporative cooler. But first of all it determines the humidity level in the air. If the air is too humid, the computer turns on the air conditioning system.

### Electrical Load Switching

The function of electrical load switching is to monitor wall switches and activate wall outlets and appliances under software control. Because a wall switch can perform any function defined by the homeowner, it could conceivably control any or even several functions based on considerations such as time of day. Due to this electrical load switching function, the Home Management System controls and monitors all electrical functions in the home.

### Energy Management

In the House of the Future, there is no need to worry about lights being left on in unused rooms. Installed motion detectors are used to turn lights on and off whenever someone enters or leaves a room. Another energy saving method is use of time of day control. This allows the swimming pool filter and pump to be automatically cycled on and off for energy conservation.

The system also monitors energy usage for the entire house. This means that the data provided can be used to make decisions regarding optimum use of appliances. The homeowner can monitor

consumption rates in terms of dollars and cents and thus can effectively change total energy usage to conserve.

Under the Display Process of the Home Management System, there are five basic activities for the homeowner to choose from. They are: Information Actions, Calendar Actions, Monitor Actions, Program Actions, and Special Actions.

Each of these actions lets the homeowner enter, store, delete, and review pertinent data. By selecting, say, Information Actions, the homeowner can, by means of the elementary screen editor, create text and graphics on the screen. This information can be stored

---

***There is no need to worry about lights being left on in unused rooms.***

---

on the disk under an eight-character file name, ready for future retrieval or modification.

In Calendar Actions the Display Process prompts for a date and message to be entered. Later, when information for a specific date is requested, the text of the appropriate message is displayed.



*The primary microcomputer node is this built-in node and display terminal located in the entertainment room.*

## House of the Future, continued...

Monitor Actions displays the status of all major system processes, including security, energy management, environmental and load managers. Each of these processes returns data pertaining to load statuses, energy consumption, and room temperatures. This important information is then formatted by the Display Process which displays it on the screen for analysis by the homeowner.

Program Actions let the homeowner add, delete, or examine entries from the control tables of processes. Because a critical control parameter might be changed, the Display Process incorporates a level of access privilege using passwords for protection.

Special Actions is simply a means to change passwords, arm, disarm, or clear security alarms and to back up disks.

At a time when the questions of computer-controlled homes is only just being confronted, the House of the Future offers a showcase of exciting possibilities. As a successful experiment in innovative applications of off-the-shelf hardware and software, this unique structure points the way for manufacturer and consumer alike.

The House of the Future shows that computer control of the home can be, and indeed has been, achieved. And if its Home Management System is anything

to go by, then the average homeowner can look forward to increasingly widespread use of computers to monitor and control every conceivable house function.

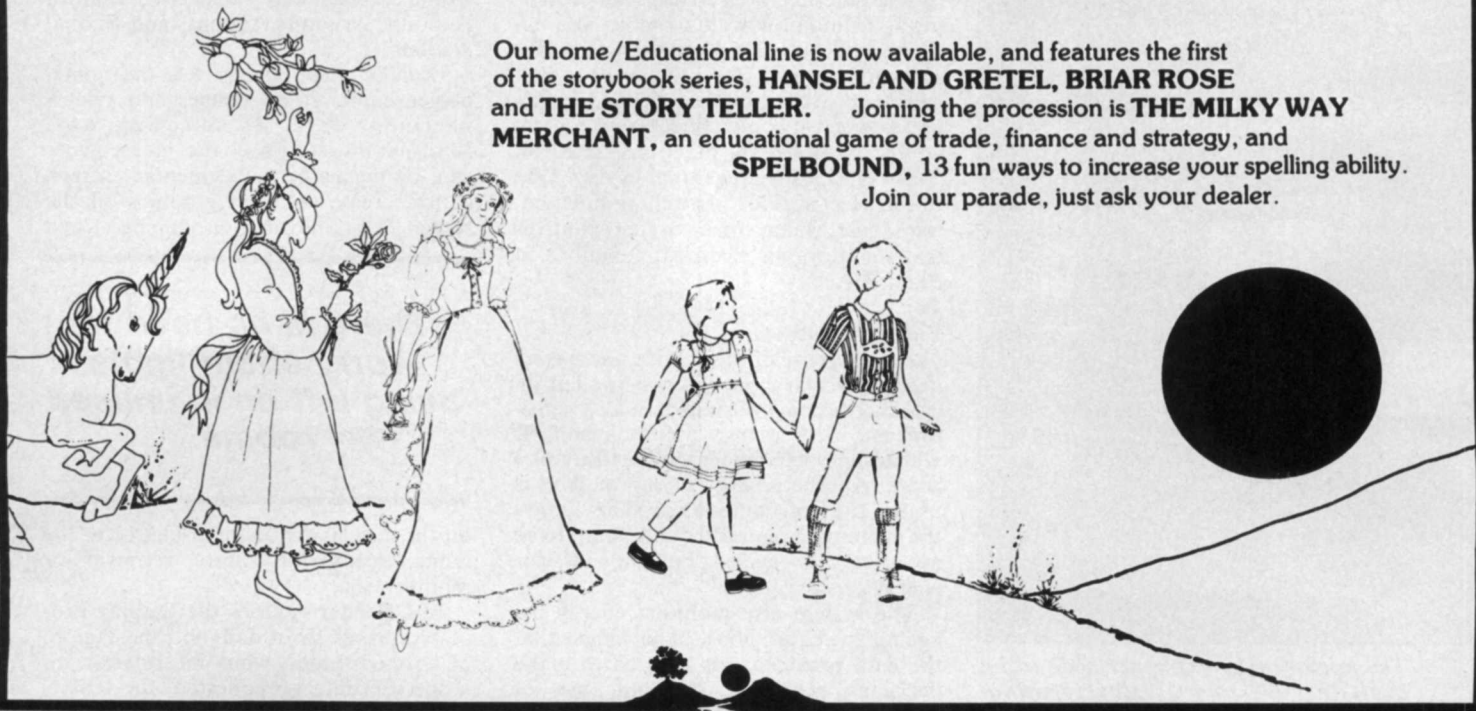
As a herald of tomorrow's world,

Arizona's House of the Future is an indication that the computer-controlled American home is just around the corner—available for anyone and everyone who has ever dreamed of its creativity and convenience. □



## FROM OVER THE HORIZON COMES BLYTHE VALLEY SOFTWARE

Our home/Educational line is now available, and features the first of the storybook series, **HANSEL AND GRETEL**, **BRIAR ROSE** and **THE STORY TELLER**. Joining the procession is **THE MILKY WAY MERCHANT**, an educational game of trade, finance and strategy, and **SPELBOUND**, 13 fun ways to increase your spelling ability. Join our parade, just ask your dealer.



BLYTHE VALLEY SOFTWARE

P. O. Box 353 / 40879 Hwy 41, Silver Creek Center, Suite 1-1, Oakhurst, CA 93644 (209) 683-4735

CIRCLE 113 ON READER SERVICE CARD

# WE ARE TUNED TO YOUR NEEDS AND WE BRING YOU THE BEST FOR LESS

## SPECIALS

### APPLE

Home Accountant.....	51.50
Super Text Professional .....	69.95
Maize Craize.....	29.95
Krell Logo .....	72.95
PFS File/Graph/Report .....	86.50

### APPLE

Super Calc. ....	151.95
<b>ATARI(d)</b>	
Crush Crumble & Chomp ....	21.95
Serpentine .....	24.50
Bank Street Writer .....	52.50

### IBM

Master Type .....	34.95
Tigers In The Snow .....	30.95
<b>COMMODORE-64(d)</b>	
Jaw Breaker .....	24.50
Temple of Apshai .....	29.95

### APPLE EDUCATIONAL

	Retail Price	Your Price
<b>BrainBank</b>		
Reading - Four Basic Reading Skills	59.95	47.95
<b>Edi-Ware</b>		
Algebra I, II, III & IV	39.95	29.95
Algebra V & VI	49.95	39.95
Counting Bee	29.95	22.50
SAT Word Attack Skills	49.95	37.50
Spelling Bee and Reading Primer	39.95	29.95
Hands on Basic Programming	79.95	59.95
<b>Lightning</b>		
Master Type	39.95	29.95
<b>P.D.I.</b>		
Step by Step 1 (Applesoft Tutorial)	89.95	69.95
Step by Step 2 (Intermediate Basic)	89.95	69.95
<b>S.E.I.</b>		
Math Pak For SAT	54.95	46.95
Vocabulary, Word & Sentence for SAT	64.95	55.50
<b>The Learning Company</b>		
Gertrude's Puzzles	44.95	34.95
Rocky's Boots	49.95	39.95

### APPLE GAMES

<b>Automated Simulations</b>		
Crush, Crumble & Chomp	29.95	20.95
Tuesday Morning Quarterback	29.95	20.95
<b>Avant-Garde Creations</b>		
Hi-Res Computer Golf II	39.95	27.95
<b>Beagle Brothers</b>		
Beagle Bag	29.95	20.95
<b>Broderbund</b>		
Choplifter	34.95	24.50
Serpentine	34.95	24.50
A.E.	34.95	24.50
<b>BudgeCo</b>		
Raster Blaster	29.95	20.95
Pinball Construction Set	39.95	27.95
<b>Data Most</b>		
Tubeway II	34.95	24.50
Aztec Adventure	39.95	27.50
<b>Datasoft</b>		
Zaxxon	39.95	27.95
<b>Edu-Ware</b>		
The Prisoner II	32.95	23.50
Rendezvous	39.95	27.95
<b>Infocom</b>		
Zork I, II & III	39.95	27.95
Deadline	49.95	34.95
StarCross	39.95	27.95
Suspended	49.95	34.95
<b>Microlab</b>		
Miner 2049er	39.95	27.95
<b>Muse</b>		
Robot War	39.95	27.95
Castle Wolfenstein	29.95	20.95
Caverns of Freitag	29.95	20.95
<b>Penguin Software</b>		
Pie Man	19.95	15.95
Transylvania	19.95	15.95
Spy's Demise	19.95	15.95
<b>Quality Software</b>		
Beneath Apple Manor	29.95	20.95
Ali Baba & the 40 Thieves	32.95	23.50

### Sierra On-Line

Timezone	99.95	69.95
Dark Crystal	39.95	27.95
Ultima II	59.95	41.95
<b>SirTech</b>		
Wizardry: Proving Grounds	49.95	34.95
Wizardry: Knights of Diamonds	34.95	24.95
Wizardry: Legacy of Lylgarn	39.95	27.95
Star Maze	34.95	24.50
Balatic Attack	29.95	20.95
<b>Strategic Simulations</b>		
Shoot'em up in Space	39.95	27.95
The Cosmic Balance	39.95	27.95
Germany 1985	59.95	41.95
North Atlantic 1986	59.95	41.95
<b>Sublogic</b>		
Space Vikings	49.95	34.95
<b>Synergistic Software</b>		
Microbe	44.95	31.50
<b>UltraSoft</b>		
Mask of the Sun	39.95	27.95
The Serpent's Star	39.95	27.95

### APPLE BUSINESS

<b>Artiscl</b>		
Magicalc	149.95	104.95
<b>Ashton-Tate</b>		
dBase II	699.95	489.95
<b>Broderbund</b>		
Payroll	394.95	276.50
General Ledger/Payables	494.95	346.50
Accounts Receivables	394.95	276.50
Bank Street Writer	69.95	49.95
<b>L.J.K.</b>		
Letter Perfect	149.95	104.95
Data Perfect	129.95	90.95
<b>MicroPro</b>		
Wordstar (CP/M)	494.95	346.50
<b>Microsoft</b>		
Multiplan	274.95	192.50
<b>Sensible Software</b>		
Sensible Speller (New)	124.95	94.95
<b>Sierra On-Line</b>		
Screenwriter Professional	199.95	139.95
General Manager II	229.95	160.95
<b>Silicon Valley Systems</b>		
List Handler	89.95	62.95
<b>Systems Plus, Inc.</b>		
GI/AP/AR/Inv.	395.00	295.00

### APPLE UTILITIES

<b>Beagle Brothers</b>		
Apple Mechanic	29.95	20.95
DOS Boss	23.95	19.50
Tip Disk #1	19.95	15.95
Utility City	29.95	20.95
Flex Tex	29.95	20.95
Frame Up	29.95	20.95
Typefaces (used with Apple Mechanic)	19.95	15.95
Pronto DOS	29.95	20.95
Double Take	34.95	24.50

### Hayden

Applesoft Compiler Plus	99.95	69.95
<b>Penguin Software</b>		
Complete Graphics System II	69.95	48.95
The Graphics Magician	59.95	41.95
<b>Phoenix Software</b>		
Zoom Grafix	49.95	34.95
<b>Southwestern Data Systems</b>		
Munch-a-Bug	49.95	34.95
Merlin	64.95	45.50
Assembly Lines	19.95	15.95

### APPLE HARDWARE

<b>Advanced Logic Systems</b>		
CP/M Card	399.95	338.95
Z Card II	169.95	142.95
Smarterm II	179.95	151.95
<b>Hays Microcomputer Products</b>		
Micromodem II with Terminal Program	408.95	306.95
<b>Kensington Microwave</b>		
System Saver	89.95	67.95
<b>Novation</b>		
Apple-Cat //	388.95	291.95
<b>RGB Designs</b>		
16K Ramcard	79.95	54.95
Disk Drive (Add on)	339.95	259.95
<b>TG Products</b>		
Joystick (New)	64.95	45.50
Paddle	39.95	27.95
Select-a-Port	59.95	41.95
<b>Verbatim</b>		
5-1/4" Datalife - Soft Sector (ss/dd)	47.50	33.50
5-1/4" Disk Cleaning Kit	12.50	10.50
5-1/4" Disk Drive Analyzer	65.00	51.00

### ATARI DISC(d)/CASSETTE(c)

Preppie (c/d)	29.95	22.50
Apple Panic (c/d)	29.95	22.50
David's Midnight Magic (d)	34.95	26.50
Raster Blaster (d)	29.95	22.50
Canyon Climber (c/d)	29.95	22.50
Clowns & Balloons (c/d)	29.95	22.50
Pacific Coast Highway (c/d)	29.95	22.50
Sands of Egypt (d)	39.95	29.95
Zaxxon (c/d)	39.95	29.95
Ultima II	59.95	44.95
Temple of Apshai (c/d)	39.95	29.95
Castle Wolfenstein (d)	29.95	22.50
Jeepers Creepers (d)	29.95	22.50
Lunar Leepers (d)	29.95	22.50
Jawbreaker (c/d)	29.95	22.50
Ultima I (d)	39.95	29.95
Wayout (d)	39.95	29.95
Pinball (c/d)	29.95	22.50
Claim Jumper (c/d)	34.95	26.50
Chicken (c/d)	34.95	26.50
Slime (c/d)	34.95	26.50
Protector II (c/d)	34.95	26.50
Dodge Racer (c/d)	34.95	26.50
Picnic Paranoia (c/d)	34.95	26.50
Reptilian (c/d)	34.95	26.50
File Manager 800 (d)	98.95	73.75

for mail orders:

With your selection(s), please include name, address and phone number along with your check, money order, or credit card number and expiration date. Please include \$3.00 for shipping and handling (foreign orders/hardware extra). California residents add 6% sales tax.

# 800-942-2058

# (415) 237-4406



California, Alaska & Hawaii/Foreign Orders

# NONAGON SOFTWARE

P.O. BOX 1486  
EL CERRITO, CA 94530

CIRCLE 164 ON READER SERVICE CARD

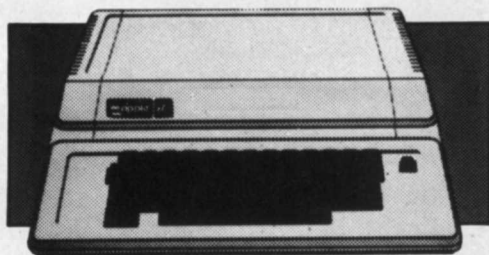


# Professionals T.M.

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT.

## apple II+/IIe supply center

DEALERS  
WE BUY  
EXCESS  
INVENTORIES



APPLE IIe 64K, 40 COLUMN \$1,175  
APPLE IIe 128K, 80 COLUMN \$1,395

APPLE IIe, STARTER SYSTEM BY APPLE (System A)

64K and 80 column  
1 Disk II with controller  
Apple Monitor III  
Monitor Stand \$1,750

APPLE IIe STARTER SYSTEM BY COMPUTER EXCHANGE

[SYSTEM B] Includes 64K/80 Col. Card by Apple or ComX.

128K and 80 column

1 Micro-Sci Drive with controller

Filer, Utility and DOS 3.3 Diskette

Sanyo 9" Green Monitor

RF Modulator (for color TV)

Game Paddles

Game with color graphics and sound \$1,875

WARRANTY is 100% Parts & Labor for 90 days by us on all above.

To substitute or delete drive on System B, subtract \$245 and

add drive price.

To add Micro-Sci A2 Drive to above, add \$245.

To substitute or delete monitor on System B, subtract \$130 and add

other monitor price (System M).

### DISK DRIVES for APPLE II+ /IIe



	LIST PRICE	OUR PRICE
A2, 5-1/4", 143K Disk Drive	\$ 479	\$ 259
Controller Card for A2 Drive	\$ 100	\$ 79
A40, 5-1/4", 160K Disk Drive	\$ 449	\$ 339
A70, 5-1/4", 289K Disk Drive	\$ 599	\$ 299
Controller for A40 or A70	\$ 100	\$ 79
Filer, Disk Utility Software	\$ 20	\$ 15

### VISTA

Solo, 5" 143K Disk Drive	\$ 300	\$ 249
Std. Height		
Dual, 5", Double Sided, 320K	\$ 420	\$ 329
Quarter, 5", 2 Duets Side by Side		
or Standard Cabinet	\$ 715	\$ 575
Controller Card	\$ 89	\$ 75
V1000 Dual 8", Std. Format		
w/Controller, Complete	\$2195	\$1295
V1200, 5", 6MB Disk Pack System	\$1549	\$1199

### TEAC

*143K Disk Drive, 1/2 High	\$ 379	\$ 279
Controller Card	\$ 89	\$ 69
*Electronics by ComX		
C.P. SOFTWARE, Filer, Utility and DOS 3.3	\$ 20	\$ 15

## HARDWARE for Apple II

### RAM EXPANSION

	LIST PRICE	OUR PRICE
ComX, for Ite, 80 col. 64K Adder Card	\$ 295	\$145
★ ComX, RAM Card, 2 Yr. Wty.	16K \$ 179	\$ 39
★ Microsoft, RAM Card	16K \$ 100	\$ 79
★ Saturn Systems, RAM Card	32K \$ 249	\$169
	64K \$ 425	\$319
	RAM Card	\$ 599
★ Axlon RAM Disk System	320K \$1395	\$795

### VIDEO CARDS

★ ALS, Smartterm II	\$ 179	\$139
Dirt Cheap Video, 64 col.	\$ 89	\$ 69
ComX, for Ite, 80 col. 64K Adder	\$ 295	\$145
Videx, Videoterm 80 col.	\$ 345	\$229
UltraTerm	\$ 379	\$279
Soft Video Switch	\$ 35	\$ 25
Enhancer II	\$ 149	\$ 99
Function Strip	\$ 79	\$ 59
Full Video Line, Call. Up to 35% off		
Vista, Vision 80	\$ 289	\$199

### MISCELLANEOUS

ALS, Smartterm II	\$ 399	\$299
Z-Card	\$ 169	\$129
Color II	\$ 179	\$139
ASTAR, RF Modulator	\$ 35	\$ 25
CCS, Serial Interface 7710A	\$ 150	\$129
Den Paymar, Lower Case Chip	\$ 50	\$ 39
Don't Ask, DAO 003 S.A. Mouth	\$ 125	\$ 85
★ Eastside, Wild Card, copier	\$ 130	\$ 99
Kensington, System Saver	\$ 90	\$ 69
Key Tronic, KB200 keyboard,		
84 keys (for II+)	\$ 298	\$198
Kraft, Joystick (Ap II/II+)	\$ 65	\$ 49
Paddle (Ap II/II+)	\$ 50	\$ 39
M&R, Sup Rian	\$ 50	\$ 39
★ Microsoft, 280 Softcard	\$ 345	\$245
Softcard Premium Pack	\$ 695	\$495
Softcard Premium Pack Ite	\$ 495	\$395
★ Orange Micro, Grappler Plus	\$ 165	\$119
Practical Peripherals,		
MBS 8K Serial (Epson)	\$ 159	\$129
MBP 16K Para (Epson)	\$ 159	\$129
Microbuffer II 16K, (specify)	\$ 259	\$209
Microbuffer II 32K, (specify)	\$ 299	\$229
★ PCPI, Appli-Card, 14 features.		
4 Mhz	\$ 295	\$235
6 Mhz	\$ 375	\$275
RH Electronics, Super Fan II	\$ 75	\$ 59
★ Saturn Systems, Accelerator II	\$ 599	\$449
SSM, A10 II, Serial/Para Interface	\$ 225	\$169
TG Products, Game Paddles (II+)	\$ 40	\$ 29
Joystick (II+)	\$ 60	\$ 45
Select-A-Port (II+)	\$ 60	\$ 45
Trak Ball (II+)	\$ 65	\$ 44
Videx, PSIO, Para Ser Interface	\$ 229	\$169
WICO, Trackball (Ap II/II+)	\$ 90	\$ 61
Analog Joystick	\$ 70	\$ 47

## SOFTWARE on disk for Apple II/II+ /IIe

### BUSINESS

	LIST PRICE	OUR PRICE
Apple Computer, Inc.		Call
50% off list, on Apple Inc. software		
Applied Soft Tech., VersaForm	\$ 389	\$265
Artsci, MagicWindow II	NEW! \$ 150	\$ 99
Ashton-Tate, dBase II (CP/M)	\$ 700	\$439
Financial Planner	\$ 700	\$439
User's Guide by Software Banc	\$ 30	\$ 20
BPI Systems, GL, AR, AP, PR or INV, each	\$ 395	\$295
Job Cost	\$ 595	\$435
Broderbund, Bank Street Writer	\$ 70	\$ 47
Continental, GL, AR, AP or PR ea	\$ 250	\$169
1st Class Mail	\$ 75	\$ 49
Home Accountant	\$ 75	\$ 49
FCM (F.I.E., C.A.T., MAIL)	\$ 100	\$ 68
Hayden, Pie Writer (Specify brd.)	\$ 150	\$ 99
Howard Soft,		
Real Estate Analyzer II	\$ 195	\$129
Tax Preparer	\$ 225	\$149
Info. Utilim., Easywriter (PRO)	\$ 175	\$119
LJK, Letter Perfect w/ Mail Merge	\$ 150	\$ 99
★ Micro Craft, (requires 280 CP/M Card)		
Professional Billkeeper	\$ 995	\$469
Verdict, (Legal Billing)	\$ 995	\$469
★ Micro Lab, Tax Manager	\$ 180	\$119
Micro Pro, (all require 280-CP/M Card)		
InfoStar™	\$ 495	\$269
ReportStar™	\$ 350	\$199
WordStar™ + Training Manual	\$ 495	\$269
MailMerge™	\$ 250	\$129
SpellStar™	\$ 250	\$129
3 Pak, Word + Mail + Spell, 3 above	\$ 845	\$459
WordStar™ + MailMerge™ 2 Pak	\$ 645	\$349
DataStar™	\$ 295	\$159
Microsoft, Multi-Plan (CP/M or Apple DOS)	\$ 275	\$199
Financial, Multitool (CP/M or DOS)	\$ 100	\$ 75
Budget, Multitool (CP/M or DOS)	\$ 150	\$115
On-Line, ScreenWriter II	\$ 130	\$ 89
The Dictionary	NEW! \$ 100	\$ 69
General Manager II	NEW! \$ 230	\$155
Osborne C.P. Soft, (Disk and Book)		
Some Common Basic Programs		
75 Business, Statistics and Math		
programs for the Apple II	\$ 100	\$ 49
Practical Basic Programs		
40 more very valuable programs		
beyond "Some Com Bas Prog"	\$ 100	\$ 49
Peachtree, Requires CP/M & MBasic, 40 columns.		
Series 40 GL & AR & AP, all 3	\$ 595	\$395
Series 40 Inv. or Pay., each	\$ 400	\$275
Series 9 Text & Spell & Mail, all 3	\$ 495	\$395
Perfect, Perfect Writer	\$ 295	\$219
Perfect Writer/Speller 2 Pak	\$ 295	\$219
Perfect Filer	\$ 695	\$299

	LIST PRICE	OUR PRICE
Sensible, Sens. Speller, specify version	\$ 125	\$ 85
★ Silicon Valley, Word Handler	\$ 250	\$139
Soft Sys., Executive Secretary	\$ 250	\$169
Executive Speller	\$ 75	\$ 55
Software Publishing, PFS: File	\$ 125	\$ 85
PFS: Report	\$ 125	\$ 85
PFS: Graph	\$ 125	\$ 85
Stoneware, DB Master	\$ 229	\$155
DB Utility I or II	\$ 99	\$ 69
DB Master 3 Pak, Special	\$ 687	\$387

Videx,		
Appewriter II preboot disk	\$ 20	\$ 15
Visacalc 80 col. preboot disk	\$ 50	\$ 39
Visacalc 80 col. to 176K disk	\$ 90	\$ 69
Videterm Utilities Disk	\$ 37	\$ 28
VisiCorp Personal Software,		
Visacalc 3.3	\$ 250	\$179
VisiFile or VisiDex, each	\$ 250	\$179

### UTILITY & DEVELOPMENT

Beagle, Utility City	\$ 30	\$ 22
DOS Boss	\$ 24	\$ 18
Apple Mechanic	\$ 30	\$ 22
Central Point Software		
Filer, DOS Utility	\$ 20	\$ 15
★ Copy II Plus (bit copier)	\$ 40	\$ 35
Computer Appl., Nibbles Away II	\$ 70	\$ 59
Epson, Graphics Dump	\$ 15	\$ 9
Insoft, GrafORTH by Paul Lutus	\$ 75	\$ 59
Microsoft,		
A.L.D.S.	\$ 125	\$ 75
BASIC Compiler	\$ 395	\$299
Cobol 80	\$ 750	\$559
Fortran 80	\$ 195	\$149
TASC Compiler	\$ 175	\$159
★ Omega, Locksmith (bit copier)	\$ 100	\$ 75
Penguin, Comp. Graphs, Sys.	NEW! \$ 70	\$ 53
Graphics Magician	NEW! \$ 60	\$ 41
Phoenix, Zoom Graphics	\$ 40	\$ 29
Quality, Bag of Tricks	NEW! \$ 40	\$ 29
Saturn Systems, VC-Expand	\$ 100	\$ 49
Saturn Systems, VC-Expand 80	\$ 125	\$ 69
Sensible, Back it Up, (bit copier)	\$ 60	\$ 49

### HOME & EDUCATION

Broderbund, Chophiller	\$ 35	\$ 26
BudgetCo, Pinball Constr. Set	\$ 40	\$ 27
Continental, Home Accountant	\$ 75	\$ 49
Datamost, Artec or Zaxxon, each	\$ 40	\$ 27
Infocom, Zork I or II, each	\$ 40	\$ 27
Deadline	\$ 50	\$ 34
Lightning, MasterType	\$ 40	\$ 27
Micro Lab, Miner 2049er	\$ 30	\$ 23
Muse, Castle Wolfenstein	\$ 60	\$ 40
Sierra On-Line, Ultima II	\$ 35	\$ 22
Softporn (X Rated)	\$ 50	\$ 39
Sir-Tech, Wizardry	\$ 35	\$ 22
Sub Logic, Flight Simu.	\$ 34	\$ 25

OTHER BRANDS AND PROGRAMS IN STOCK, CALL.

### WHILE THEY LAST OVERSTOCK SPECIALS

FOR APPLE IIe + Ite		
ALS, Synergizer + Supercalc + Condor (II+)	\$ 749	\$399
Anadex, DP8000, Dot Matrix Printer	\$ 995	\$595
CCS, Serial Interface 7710A	\$ 150	\$129
Calendar Clock 7424A	\$ 120	\$ 95
★ ComX, 16K RAM Card, 2 Yr. Warranty for II+	\$ 179	\$ 39
M&R, SupRterm 80 col. for II+	\$ 375	\$199
MicroCom, Micro Counter	\$ 250	\$125
MicroCom, Micro Telegam	\$ 250	\$125
Micro-Sci, A70 5" 1/4" 289K Disk Drive	\$ 599	\$299
Microsoft, 16K RAM Card for II+	\$ 100	\$ 79
Mountain, CPS Multifunction	\$ 239	\$119
Saturn Systems, 32K RAM Card for II+	\$ 249	\$169
Silicon Valley, Word Handler	\$ 250	\$139
Videx, Videoterm, 80 column card for II+	\$ 345	\$229

### SYSKOM II

#### Apple II+ Work-a-like

Syscom 2, 64K (Apple II+ Compatible)	\$ 869	\$ 659
Syscom 2, 64K Starter System (same as Apple IIe System B above except 64K, 40 columns)	\$1810	\$1195

NOTE: Substitutions and deletions same as System B apply. System 2 is software and hardware compatible to the Apple II+.

### AXLON The Leader in Atari Add-ons

Rampower 128K System (800)	\$ 475	\$295
Rampower 48K Module (for 400)	\$ 185	\$115
Rampower 32K (400 or 800)	\$ 120	\$ 59
Ramscan Diagnostic Diskette	\$ 15	\$ 12

★ Means a BEST buy.

AD #974



THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM

# Computer Exchange T.M.

A division of Conroy LaPointe

ALL MAIL: P.O. Box 23068, Portland, OR 97223

SHOWROOM AT 11507D SW PACIFIC HWY., PORTLAND, OR. OPEN M-SAT 10-5

CIRCLE 125 ON READER SERVICE CARD

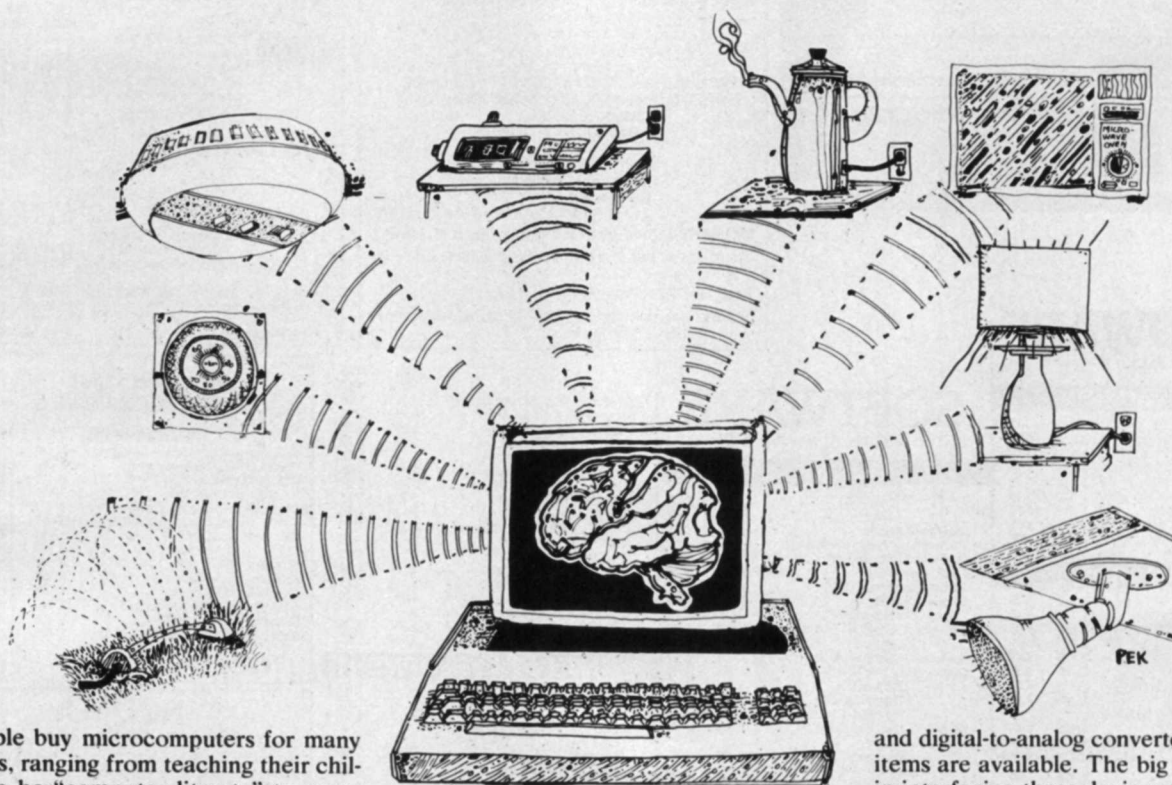
NATIONAL  
ORDER DESK TOLL FREE  
(800) 547-1289

All Other Orders Including Portland: 245-6200

Oregon TOLL FREE  
(800) 451-5151

Hot Line For Information  
On Your Order  
[503] 245-7404

## The Hypertek HomeBrain



**Glenn A. Hart**

People buy microcomputers for many reasons, ranging from teaching their children to be "computer literate" to game playing to word processing and accounting. One use which many potential and current owners assume is possible is "environmental control," which can be defined as switching or modulation of devices which affect such aspects of the user's surroundings as temperature, humidity, and lighting. The benefits of using the intelligence of a computer for such control include the fact that you can allow different actions to occur based on pre-programmed circumstances, you can accommodate complex situations, you can provide for randomness to give the appearance of human presence, and you can realize significant energy cost savings without a negative effect on comfort or safety.

Widespread publicity has been given to "the home of the future" which includes such capabilities. Given the proliferation of "intelligent" appliances and other devices with imbedded microprocessors, today's microcomputerist can envision control systems, security protection, and

other home systems which are vastly more sophisticated and flexible, while being less costly, than expensive dedicated systems.

Sound good? It should; the benefits described are real *and* possible, can make life much more enjoyable and save money. What is the catch? Simply that it doesn't make sense to use today's microcomputers for such functions.

There are many peripheral devices which allow control of external devices. Various switches, relays, analog-to-digital

and digital-to-analog converters and other items are available. The big problems lie in interfacing these devices to the microcomputer and creating the software necessary to make them do anything useful.

While some of the mechanisms use standard serial or parallel ports, most do not. Even if they do, adding input/output ports, correctly wiring the cables and controlling the devices in software is far from trivial and depends heavily on the specific computer being used. If non-standard I/O is required, the problems quickly escalate beyond the skills of even a reasonably experienced computerist.

Even if we assume that all the necessary peripheral devices have somehow been interfaced correctly to the computer, the software problem looms large. Custom devices require custom software. Even if *this* has been done, the biggest problem of all surfaces: very few current computers can do more than one thing at a time.

This means that the computer must be *dedicated* to the control function if anything useful is to be accomplished, rendering it totally unavailable for any other application. Few users will be willing to



VIC 20

# 40-80 COLUMN BOARD



only \$99<sup>00</sup>



Now you can get 40 or 80 Columns on your T.V. or monitor at one time! No more running out of line space for programming and making columns. Just plug in this board and you immediately convert your VIC-20 computer to 40 or 80 columns! PLUS, you get a Word Processor, Mail Merge program, Electronic Spreadsheet (like VISICALC) and Terminal Emulator! These PLUS programs require only 8K RAM memory and comes in an attractive plastic case with instructions. List \$149 Sale \$99

• **COMMODORE 64 COMPUTER — "80 COLUMN BOARD" LIST \$275 SALE \$179**

*(Less \$20 Accessory Purchase Discount)*

**"15 DAY FREE TRIAL"**

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa — Mastercharge — C.O.D.
- We love our customers!

**PROTECTO  
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order



## MAKE YOUR VIC-20 COMPUTER TALK

when you plug in our

ONLY  
\* \$69<sup>00</sup>

## VOICE SYNTHESIZER

You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make:

- Adventure games that talk
- Real sound action games

This voice synthesizer is VOTRAX based and has features equivalent to other models costing over \$370.00. To make programming even easier, our unique voice editor will help you create words and sentences with easy to read, easy to use symbols. The data from the voice editor can then be easily transferred to your own programs to make customized talkies.

\* FREE — Your choice of \$19.95 4" Speaker and Cabinet or \$14.95 Voice Editor if you order before June 15, 1983!

**"15 DAY FREE TRIAL"**

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa — Mastercharge — C.O.D.
- We love our customers!

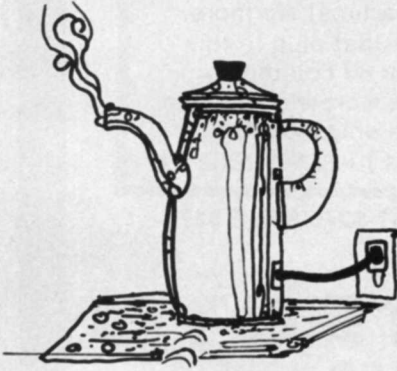
**PROTECTO  
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order

## HomeBrain, continued...

relinquish their cherished and costly computers or to buy another one just for home control. Even multi-tasking computers (ones that can execute more than one program at a time) don't fully solve the problem, since even they must be left running continuously.

These difficulties render most of the available control devices essentially useless except in special applications. While there are certainly many impressive ap-



plications of computers in device and environmental control, these are simply beyond the capabilities of most users.

### The Hypertek HomeBrain

A small company called Hypertek has developed a new product that solves these problems in a unique and clever manner. The HomeBrain is a microcomputer dedicated to home control; it is tremendously flexible and powerful. The fascinating part is that you use your current microcomputer to program the microcomputer in the HomeBrain. All the capabilities of your main system, including disk drives, high level languages, and fancy video terminal, are used, but once the HomeBrain has been programmed you don't need to touch it at all unless you want to change the programming. Your main computer is totally uninvolved and free to use for whatever you want.

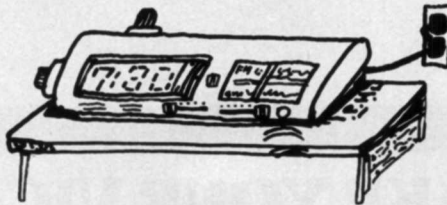
The heart of the HomeBrain is a 6502 microprocessor, the same one used in the Apple II, Atari, Commodore and other popular computers. Programs are stored in 2K of RAM, while 6K of ROM stores the HomeBrain control language discussed below. Thirty-two buffered digital inputs for a variety of devices are available, as are eight SPDT 3-amp, 125-volt relays for output devices. The number of inputs or relays can be doubled if desired.

A standard RS-232 serial port is used for communication with the main computer. Standard communication rates are 300 and 1200 baud. In a sense, the AC power cord is also an output, since the HomeBrain can also control 256 BSR or Leviton wireless home control modules by sending radio frequency signals through the AC wiring of the house. The

## **You use your current microcomputer to program the microcomputer in the HomeBrain.**

HomeBrain includes provisions for interconnecting other HomeBrains or future intelligent peripherals from Hypertek over a simple two-wire twisted pair network. Since Hypertek also manufactures HomeBrain-like devices for commercial buildings and laboratory control, it is likely they will come out with new devices in the future, so the networking provision helps assure that the HomeBrain will remain state-of-the-art.

The HomeBrain is powered by a special uninterruptible power supply which uses a continuously charged battery system and can also handle brownouts down to 95 volts. Should normal AC power fail, the HomeBrain continues to operate normally for three hours controlling battery operated devices (but obviously not BSR modules, which are dependent on AC power). After this, the HomeBrain goes



into a "sleep" mode which retains programming and other stored information for about a month.

The 32 inputs are designed for switches, relays, or open collector or low voltage devices. This includes thermostats, motion detectors (ultrasonic, infrared, microwave or whatever), smoke alarms, moisture sensors, light detectors, and a multitude of other devices. While wires from most input devices are connected directly to the HomeBrain inputs, it is possible to use radio telemetry devices to send remote data to the HomeBrain without wires. The relays of HomeBrain are normally used to turn on such devices as

## **Perhaps the biggest strength of the HomeBrain is the high level command language which is stored in ROM.**

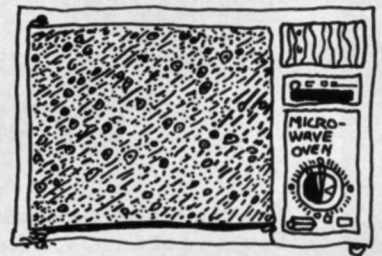
sirens and emergency lighting. Optionally available is analog input, which allows input of temperatures and other varying measurements rather than simple on/off status.

### HomeBrain Language

Perhaps the biggest strength of the HomeBrain is the high level command language which is stored in ROM. To use it, a program is run on your main computer which communicates with the HomeBrain over the serial link. This program must be customized for the main computer to initialize the serial channel. Hypertek has versions for many different computers, ranging from the Commodore Vic 20 to a variety of CP/M systems. My own system uses somewhat idiosyncratic communications chips, but Hypertek was able to write a custom routine which worked perfectly almost immediately.

The HomeBrain language consists of commands which instruct the unit to perform a wide variety of functions. Table I lists the available instructions grouped by function with an explanation of the purpose of the commands. The language is based on the concept of a *stack*, which is a kind of buffer in which the command last entered is the first available. It can be viewed as analogous to a stack of dishes, in which you would put a new dish on top of the stack and also get the next dish from the top of the pile. Users of Hewlett-Packard calculators or computer languages like Forth will feel comfortable with HomeBrain immediately, but beginners may have some problems. Overall documentation is rather technical and could be improved for the novice.

Fortunately, the software that is operated on the main computer makes programming the HomeBrain quite a bit



easier than it would be if all the instructions had to be entered one at a time. Using menus to guide the user, several of the most important functions are simplified to an interactive dialog so the user doesn't have to know the exact commands necessary to perform a function. The current software is reasonably good in this regard, but Hypertek is now upgrading it to include simplified input of even more functions.

The major programming effort consists of defining networks of commands. The

## APPLE

Snooper Troops I or II	\$37.95
Rhymes & Riddles (D)	25.50
Kinder Comp (D)	25.50
Hey Diddle Diddle (D)	25.50
In Search of Those	
Amazing Things (D)	33.95
Delta Draw (D)	51.00
Facemaker (D)	29.95
Story Machine (D)	29.95
Q-Base (D)	160.00
Versa Form (D)	297.00
Versa Form (Apple III)	421.00
Bank Street Writer (D)	52.95
Home Accountant	56.95
GL W/Payables	369.95
Receivables	289.95
Algebra 5 & 6	36.95
Supertext Professional	129.95
Master Type	29.95
Super Calc 2	221.95
Hands on Basic	58.95
Castle Wolfenstein	21.95
Caverns of Freitag	21.95
Wayout	29.95
Repton	29.95
Wizardry	36.95
Knight of Diamonds	25.95
Police Artist	29.95
Battle Cry	23.95
Temple of Apshai	29.95
Zork 1, 2, or 3	29.95
Deadline	37.95
Starcross	29.95
Suspended	37.95
Sherwood Forest	25.95

## ATARI

Sub Commander (C)	\$42.95
Jumbo Jet Pilot (C)	42.95
Soccer (C)	42.95
Kickback (C)	42.95
Home Finance Manager (T)	25.95
Darts (T)	25.95
Pool (T)	25.95
Humpty Dumpty & Jack & Jill (T)	25.95
Hickory Dickory Dock (T)	25.95
Figure Fun (T)	25.95
Save The Seven Seas (C)	42.95
ORC Attack (C)	42.95
River Rescue (C)	42.95
Major League Hockey (C)	42.95
Snooper Troops I or II (D)	38.00
Rhymes & Riddles (D)	25.95
Kinder Comp (D)	25.95
Hey Diddle Diddle (D)	25.95
In Search of Those	
Amazing Things (D)	33.95
Facemaker (D)	29.95
Story Machine (D)	29.95
Astro Chase (D/T)	25.95
Monster Smash (D)	25.95
Night Raiders (D)	25.95
Preppie 2 (T/D)	25.95
Choplifter (ROM Cart)	33.95
Serpentine (ROM Cart)	33.95
A.E. (D)	25.95
Bank Street Writer (D)	52.95
Air Strike (T)	29.95
Teletal (D)	36.95
Basic Compiler (D)	74.95
Text Wizard (D)	74.95
Spell Wizard (D)	59.95
Zaxxon (T/D)	29.95
Temple of Apshai (T/D)	29.95
Jumpman (T/D)	
(GREAT!)	29.95
Starbowl Football (T/D)	24.95
Zork 1, 2, or 3 (D)	29.95
Deadline (D)	37.95
Starcross (D)	29.95
Suspended (D)	37.95
Master Type (D)	29.95

## ATARI (con't)

Castle Wolfenstein (D)	\$21.95
Wizard of Wor (C)	33.95
Repton (D)	29.95
Survivor (T/D)	25.95
Fort Apocalypse (T/D)	25.95
Pharaoh's Curse (T/D)	25.95
Shamus 2 (T/D)	25.95

## VIC-20

River Rescue (C)	33.95
Mutant Herd (C)	33.95
Fourth Encounter (C)	33.95
Submarine Commander (C)	33.95

## TIMEX-SINCLAIR

Budget Master (T)	\$12.95
Reversi (T)	12.95
2K Trek (T)	12.95
Sabotage (T)	12.95
2K Fun Pack (T)	12.95
Gulper (T)	12.95
Astro 100-0	12.95
Cosmic Invaders (T)	12.95
Robbers of the Lost Tomb (T)	11.95
Wall Street (T)	13.95
Electronic Checkbook (T)	13.95
Data Master (T)	11.95

## COMMODORE (con't)

Coco (D)	\$37.95
Gridrunner (C)	29.95
HES Writer 64	37.95
Turtle Graphics II (C)	44.95
Retro Ball (C)	29.95
HES Mon (C)	29.95
Zork I, II or III (D)	29.95
Deadline (D)	37.95
Starcross (D)	29.95
Suspended (D)	37.95
Weather War II (T)	14.95
Medicine Man (T)	16.95
Tombs (T)	21.95
Forced Encounter (T)	18.95
Forced Encounter (D)	21.95
3D-64 Man (T)	14.95
Word Pro 3 Plus (D)	
(Great)	71.95
Quick Brown Fox (C)	
ROM	51.95
Writer's Assistant (D)	106.25
Filling Assistant (D)	106.25
Spread Sheet Assistant (D)	106.25
Personal Finance Assistant (D)	50.95
Color Craft (T)	22.95
Color Craft (D)	26.95
Meteor Madness (New) (T)	18.95
Meteor Madness (New) (D)	21.95
Fast Eddie (D)	26.25
Turmoil (D)	26.25
Squish 'M (D)	26.25
Snake Byte (D)	26.25
Type Attack (D)	29.95
Way Out (D)	26.25
Critical Mass (D)	26.25
Blade of Blackpoole (D)	26.25
Kinder Comp (D)	
(Children)	25.95
Facemaker (D)	29.95
Hey Diddle Diddle (D)	25.95
Fort Apocalypse (D/T)	26.25
Survivor (D/T)	26.25
Touch Typing Tutor (T)	14.95
Touch Typing Tutor (D)	18.95
Robbers of the Lost Tomb (T/D)	18.95
Wall Street (T/D)	18.95
Money Manager (T/D)	18.95
Data Manager (T/D)	18.95
Total Text 2.6 (T)	34.95
Total Text 2.6 (D)	38.95
Total Label (T)	18.95
Total Label (D)	21.95
Time Manager (T)	29.95
Time Manager (D)	33.95
Research Assistant (T)	29.95
Research Assistant (D)	33.95
Adventure Pack I or II (T)	14.95
Grave Robbers (T)	14.95
Trek (T)	12.95
Annihilator (T)	16.95
Kongo Kong (T)	18.95

# Take advantage of UNIVERSAL's MID-SUMMER MADNESS

**To Order:** Send certified checks, money orders, or use your Master Charge or Visa and call **1-800-343-8019**. From inside New Hampshire call **(603) 542-6175**. Personal or company checks require two to three weeks to clear. All prices are subject to change without notice. Please include \$2.00 per package for postage and handling. Canada \$5.00 p&h. Other countries include 10% for p&h. For C.O.D. add additional \$1.63 onto \$2.00 shipping & handling.



## UNIVERSAL SOFTWARE

*The Best Software for Less*  
185 Mulberry Street  
Claremont, N.H. 03743

## COMMODORE

Dome Business System (D)	\$44.95
Home Accountant (D)	56.95
Household Finance (D)	29.95
Household Finance (T)	25.95
Loan Analyzer (D)	16.95
Loan Analyzer (T)	12.95
Car Cost (D)	16.95
Car Cost (T)	12.95
Home Inventory (D)	16.95
Home Inventory (T)	12.95
Temple of Apshai (D)	29.95
Upper Reaches of Apshai (D)	14.95
Curse of Ra (D)	14.95
Jumpman (D) (GREAT!)	29.95

Choplifter (C)	29.95
Trashman (C)	29.95
Home/Office (T)	21.95
HES Writer	29.95
VIC Forth (C)	44.95
Exterminator (T)	18.95
Krazy Kong (T)	9.95
Touch Typing Tutor (T)	14.95
Annihilator (T)	14.95
Kongo Kong (T)	14.95
Trek (T)	14.95
Flash 'N Math	11.95
Flash 'N Spell	11.95
Serpentine (C)	29.95
Shark Trap (T)	14.95
Martian Raider (T)	14.95
Rat Hotel (C)	29.95

## Hardware for 64 & VIC 20

Cardboard/6	\$89.95
Cardram/16	67.95
Cardprint/a	67.95
Cardboard/3	33.95
Cardette/1	33.95
Cardriter/1	33.95

## BOOKS

Elementary 64	\$11.25
---------------	---------

**CALL NOW**  
**1-800-343-8016**  
**TOLL FREE**

## HomeBrain, continued...

HomeBrain scans these networks four to ten times every second (depending on the complexity of the programming), and checks for inputs and other events. It then carries out whatever steps are necessary to implement your home control strategy.

Table 1 hints at the tremendous flexibility available. It is not exaggerating to say that practically *anything* is possible with the HomeBrain. The HomeBrain can do so many things that it clearly isn't possible to describe all of them in an evaluation like this, but perhaps a few examples will give you some idea of the possibilities.

### The HomeBrain At Work

Security systems can use a wide variety of sensors. Doors and windows can be wired with magnetic switches (which can be imbedded in the frames so they are not visible to you or to a potential intruder). Microwave, infrared, or ultrasonic detectors can be used to sense motion, or audio discriminator devices can be used to sense the noise of an

***My HomeBrain is  
programmed to  
allow me to  
deactivate my fire  
sequence within 30  
seconds, in case the  
detectors have been  
set off by  
broiling lamb chops.***

attempted break in. Some of these devices are available with radio frequency output with a receiver that is placed at the HomeBrain end and totally eliminates wiring.

Outputs can use several types of sirens or lights which can be made to turn on continuously or flash either inside or outside the house. If the appropriate equipment is connected to the HomeBrain, telephone contact can be made with the local police or fire department, ordi-

nances permitting, or with commercial security services. Actuation of the system can be with simple switches with the normal exit and entry delays programmable for your needs, or a more clever system can be constructed. For example, the system could be disarmed by closing a door three times within 20 seconds.

The advantages of such a security system include total adaptability and the ability to structure multiple tiers of security. To avoid annoying and embarrassing false alarms, one could activate motion detectors inside the house only after a window or door switch was opened.

Handling a fire can be equally sophisticated. I use smoke detectors with RF outputs to avoid wiring. When actuated, these detectors emit a loud siren. My HomeBrain is programmed to allow me to deactivate my fire sequence within 30 seconds, in case the detectors have been set off by broiling lamb chops. If it is a real emergency, the HomeBrain activates sirens outside the house to alert neighbors, flashes outside lights and turns on

Table 1. HomeBrain Language Commands.

1. *Network Commands* - Networks are short control programs consisting of a series of commands. The HomeBrain can store 32 such networks, each of sufficient length for even complex control schemes.

ENANET - Enable network.

DISNET - Disable network.

SKPNET - Skip balance of network (conditional).

CLRNET - Clear network from memory.

2. *Input Commands* - Used to check the internal registers of the HomeBrain so logical decisions can be made.

INPUT - PUSH the current status of a register onto the stack.

TRUP - Checks the register for a transition from off to on since the previous scan.

TRDN - Checks for the transition from on to off.

TRCH - Checks for either change (on to off or off to on).

3. *Output Commands* - Used to update the status of registers.

OUTPUT - Turns a register on or off depending on stack.

OUTCON - Conditionally turns register on or off, used with the TRCH command.

OUTCC - Sends commands to BSR modules. Can control on/off status, dimming, etc. for 256 BSR devices.

ONREG - Turn on a register.

OFFREG - Turn off a register.

4. *Logical Commands and Stack Manipulation* - Used to manipulate the stack and link various HomeBrain registers together.

AND - Logical ANDs two previous stack entries and PUSHes the result onto the stack.

OR - Logical OR.

XOR - Logical EXCLUSIVE OR.

NOT - Inverts the last entry on the stack.

ON - PUSHes an on onto the stack.

OFF - PUSHes an off onto the stack.

PUSH - PUSHes the stack, creating a duplicate of the last entry.

POP - POPS the stack to recover a previous entry.

5. *Counter Commands* - The HomeBrain maintains sixteen 16-bit counters. A counter is linked with an output register; when the counter is set, the register is turned off; when the counter decrements to zero the register is turned on.

DEFCNT - Define the counter by linking the counter with an output register.

SETCNT - Set a counter to a new value.

DECCNT - Decrement (reduce by one) the counter.

REACNT - Read the value currently in the counter.

6. *Timer Commands* - Sixteen 16-bit timers are available for various purposes. The timer is on when a reference input register is on. When the timer decrements to zero an output register is turned on.

DEFTMR - Associate a timer with an input and output register.

SETTMR - Set a timer to a new time count.

ENATMR - Enable a timer.

DISTMR - Disable a timer.

REATMR - Read the time remaining, definition and status of a timer.

7. *Alarm Clock Commands* - Sixteen internal alarm clocks are maintained. A seven-day enabling schedule controls the days the alarm clock is available. If the alarm is enabled on a given day, an output register is turned on when the time is reached.

DEFALM - Define an alarm clock, including its output register and day of week enable schedule.

SETALM - Set an alarm clock to a specific time.

ENAALM - Enable an alarm clock.

DISALM - Disable an alarm clock.

REAALM - Read the time setting, output register, status and day of week schedule for an alarm clock.

8. *Calendar Commands* - Turns a register on at midnight of any specified date.

DEFCAL - Define link between a given calendar event and an output register.

SETCAL - Set the date for a calendar event.

REACAL - Read the date and output register for a calendar event.

9. *Data Monitor Commands* - Sixteen data monitors accumulate the total time an internal register is on. This can be used for power consumption and cost calculations.

DEFMON - Begin monitoring any specified HomeBrain register.

REAMON - Read time and output register for a data monitor.

10. *Schedule Commands* - Sixteen schedules allow controlling output registers with 15 minute precision over a weekly schedule. Immediate commands can override the schedule without affecting future operation.

DEFSCD - Define a schedule by indicating the output register to be linked with a selected schedule on a given set of days of the week.

ENASCD - Enable a schedule.

DISSCD - Disable a schedule.

REASCD - Read a schedule, its definition and the associated output register.

11. *Real-Time Clock Control* - The HomeBrain has a real-time clock which maintains the time, date, year and day of week.

SETTIM - Set the time.

REATIM - Read the time.

SETDAT - Set the date.

READAT - Read the date.

12. *Carrier Current Table Control* - A 32-byte table, which contains address codes for specific BSR modules is maintained. Each entry in the table is linked directly to a HomeBrain in-

ternal register. A change in that register automatically actuates the associated BSR device.

DEFCC - Define entries in the carrier current table.

REACC - Read the entire carrier current table.

13. *Power Failure Table Control* - The HomeBrain maintains an internal table which controls what happens in the event of a power failure and also what takes place when power is restored.

DEFPF - Sets an entry in the power failure table, which can indicate that a register should be turned off if power fails or be left alone.

REAREG - Read a register's status, including its power failure table entry.

14. *Password Control* - The HomeBrain can recognize a 4-byte password to allow restricting access to the programming of the unit to authorized users.

ENAPAS - Enable communications by providing the authorized password.

DISPAS - Disable communications until the password is provided.

NEWPAS - Assign a new password.

15. *Time Jog Control* - The HomeBrain can randomly vary the actuation of all alarm clocks and schedules so events are not too predictable during a long absence.

ENAJOG - Enable the scheduling offsets.

DISJOG - Disable the scheduling offsets.

16. *Sequencer Commands* - The HomeBrain can simulate stepping switches using internal registers as the individual contacts.

DEFSEQ - Define a sequencer by specifying the starting register and the length of the sequence.

INCSEQ - Step or increment a sequencer.

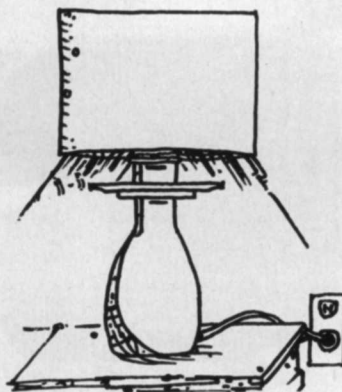
CLRSEQ - Reset or clear a sequencer back to its starting register.

REASEQ - Read the status and definition of a sequencer.

battery operated emergency lighting which indicates the correct exit path from the house even in confusing, smoke filled circumstances. My house doesn't have forced air heating and air conditioning, but if it did the HomeBrain could have been programmed to turn off air motion if a fire developed. Since smoke circulation through a ventilation system is a major problem in home and commercial fires, this ability could be of great importance.

Controlling interior lighting can be much more powerful than with the BSR modules alone (by the way, normal BSR command consoles can still be used for manual control of BSR devices). Hitting a single switch once turns on the lights in an area. Hitting it again once or twice brings the lighting to pre-programmed dimming levels appropriate for different activities. The BSR modules can also be used for timed activities such as brewing coffee in the morning.

The timing abilities built into the HomeBrain can be used for other control purposes as well. Programming a set-back thermostat (when the temperature varies throughout the day) is easy. Depending on how your home heating system is set up, the HomeBrain can easily establish different heating programs for different



areas of the house. Even in a one-zone system, a simulation of multi-zone operation can be programmed so that the thermostat in one area is in control during specified hours. Central air conditioning can be similarly controlled, or window units can be manipulated with BSR appliance modules.

The motion detectors used for security can also be used in conjunction with timers and other mechanisms for multiple purposes. In my house, the interior microwave sensors do nothing in the daytime unless security is activated. In the evening, a person entering the room turns on the lights. They stay on for ten minutes unless there is more motion in the room, in which case they continue on. Activating the security system programs the HomeBrain to consider motion an intrusion if certain other events have also taken place.

I also use microwave detectors on my doors to act as doorbells. A chime is rung

# APPLE

Apple II E ..... \$1149.00  
 Apple Monitor III  
 w/ Stand ..... \$ 199.00  
 Apple Disk II ..... \$ 399.00  
 Apple 80 Col. Card ... CALL  
 Apple Extended 80 Co.  
 Card ..... CALL  
 Apple II E Starter  
 System II E, 80 Co. Card,  
 Monitor III, Monitor Stand,  
 Disk II+,  
 Controller ..... \$1699.00



## FRANKLIN

**Starter System**  
 Color Computer, AceWriter II, AceCalc,  
 Ace 80 Col. Card, Ace 10 Disk Drive &  
 Controller, 12" Green Screen  
 Monitor..... CALL  
**Starter System**  
 w/EPSON MX80 III  
**Printer Interface Card**  
 and Cable ..... \$1829.00  
 ACE 1200 (1 Disk) . \$1799.00  
 ACE 1200 (2 Disk) . \$2199.00

ACE 1000  
 \$849.00

ACE 1000  
 w/ color  
 \$ 999.00

## SMITH-CORONA TP-I DAISY WHEEL PRINTER

TP1-Serial ..... \$469.00\*  
 TP1-Parallel ..... \$479.00\*  
 Tractor Feed .... \$129.00

\*\$50.00 Factory Rebate  
 from Smith-Corona

# EPSON

EPSON AMERICA, INC.

MX 80 III.....\$359.00  
 MX 100 III.....\$599.00  
 FX 80.....\$589.00  
 MX 80 FT III....\$499.00

## RanaSystems

Elite I.....\$260.00  
 w/Controller.....\$320.00

Elite II.....\$460.00  
 w/Controller.....\$530.00



# OKIDATA

ML 80 ..... \$ 325.00  
 ML 82A ..... \$ 389.00  
 ML 83A ..... \$ 623.00  
 ML 84P ..... \$ 949.00  
 ML 84S ..... \$1019.00  
 ML 92P ..... \$ 489.00  
 ML 92S ..... \$ 559.00  
 ML 93P ..... \$ 829.00  
 ML 93S ..... \$ 899.00  
 Okigraph I ..... \$ 40.00  
 (Specify 82 or 83)  
 Okigraph II ..... \$ 50.00  
 (For Apple or Franklin)  
 Roll Paper Stand ..... \$ 30.00  
 For 82A  
 Tractor Feed..... \$ 50.00  
 For 82A



Micro Modem II ..... \$275.00  
 Micro Modem II ..... \$529.00  
 w/Terminal  
 Program ..... \$309.00  
 Smart Modem 1200 ... \$529.00

## Novation



Applecot II ..... \$269.00  
 Includes Free Time On Source,  
 Operating Software, and your choice of a  
 free Handset or BSR Controller  
 212 Applecot  
 Upgrade ..... \$329.00  
 BSR Controller ..... \$ 19.00  
 Handset ..... \$ 29.00  
 Expansion Module ..... \$ 39.00  
 \*CAT ..... \$150.00  
 \*D-CAT ..... \$170.00  
 \*AUTOCAT ..... \$559.00  
 \*J-CAT ..... \$120.00  
 \*SMART CAT 103 ..... \$189.00  
 \*Require RS 232 Interface

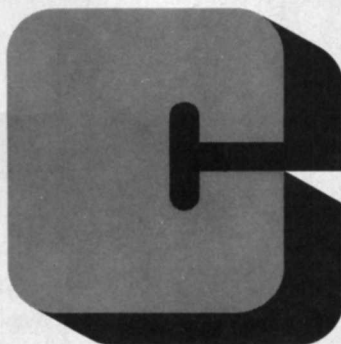
## SANYO

**MBC 1000 System**  
 64K RAM  
 320K 5 1/4" Disk  
 Printer Port  
 RS 232 Communications Port  
 12" AntiGlare Green Monitor  
**\$2,000 SOFTWARE VALUE  
 FREE WITH PURCHASE**  
 Datastar-Micropro  
 Reportstar-Micropro  
 Calcstar-Micropro  
 Wordstar-Micropro  
 Mailmere-Micropro  
**\$1599.00  
 COMPLETE SYSTEM**

## DOW JONES SOFTWARE™

Market Analyzer  
 Market Microscope  
 Market Manager  
 Connector

**CALL FOR PRICING**



Prices subject to change without notice  
 (up or down).

## Carolina Microsystems

For technical information, call 1-803-  
 781-8081. **To order, call tollfree:**  
**1-800-845-7077.** Add 3% for Visa or  
 MasterCard. All prices include UPS  
 shipping to anywhere in the U.S.A. Or  
 send check or money order to Carolina  
 Microsystems, 6 Tipton Circle, Irmo,  
 South Carolina 29063.

## HomeBrain, continued...

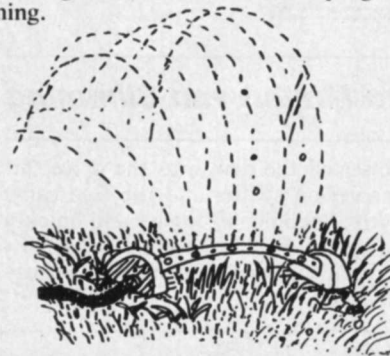
whenever anyone approaches a door unless I have switched this function off to avoid constant ringing when my children are playing in the area. The "doorbell" also flashes lights in my third floor office so I don't have to worry about hearing the chime if the door is closed (this also saved me the trouble of wiring anything to the third floor).

Other types of sensors expand the possibilities. Light sensors can automatically change the programming based on whether it is day or night. Moisture sensors can be used either to give an alarm if water enters a basement or to control automatic sprinkler systems. Unlike the simple timers that come with sprinkler systems, the HomeBrain can be programmed to turn on the water if the moisture drops below a certain level, unless it is between 11:00 a.m. and 3:00 p.m. when the sun is overhead and unless the program has been deactivated with a switch (we wouldn't want it to sprinkle our guests on Saturday afternoon). Controlling a greenhouse would be just as easy.

By now, you should be getting some idea of how truly powerful the HomeBrain is, and the tremendous control over your environment it can produce. My personal HomeBrain has converted my old house into an absolutely state-of-the-art "Home of the Future" with a minimum of fuss, and I can constantly change the operation

## ***My personal HomeBrain has converted my old house into an absolutely state-of-the-art "Home of the Future."***

of the system to reflect new circumstances, changing needs, or the appearance of new technology. My HomeBrain has been in constant use for six months with no problems whatever, and Hypertek has been very cooperative and helpful in advising me on installation and programming.



### Cost

The cost of such a set up has to be considered in several contexts. The \$999 cost of the HomeBrain itself is only the beginning. Depending on the situation and how fancy you want to get, it is easy to spend twice this amount or more for the various motion sensors, smoke detectors, BSR modules and other devices which can be connected. If you already have a home computer, that cost is taken care of; otherwise, an inexpensive Vic, Atari, TI or the like will do just fine (and do many other useful things for you as well). Installation can be a bit of a chore and expense, although it is not at all difficult to do this yourself.

This is clearly quite a bit of money. However, a fully configured HomeBrain system still costs much less than most professional security systems and obviously is very much more flexible and powerful.

All in all, the HomeBrain is one of the most exciting devices I have come across in quite a while. We computer types can get a bit jaded with new technology, but the HomeBrain has never ceased to please me and amaze my friends.

Hypertek, 30-4 Farm Rd., Somerville, NJ 08876. (201) 874-4773. ☐

CIRCLE 404 ON READER SERVICE CARD

# 1-800-272-1600

## WE'VE SLASHED OUR PRICES EVEN LOWER!

...to keep your Hardware on the "FAS-TRACK"

### IBM PC

APPLE PANIC	\$19.95
ZORK I	26.95
ZORK II	26.95
ZORK III	26.95
DEADLINE	32.95
STARCROSS	26.95
SUPENDED	32.95
FROGGER	23.95
CROSSFIRE	19.95
ULYSSES & GOLDEN FLEECE	26.95
MOUSATTACK	23.95
WIZARDRY	39.95

### ATARI ON DISK

RASTER BLASTER	19.95
PINBALL CONSTRUCTION SET	26.95
BANK STREET WRITER	46.95

### ATARI ON DISK

AE	\$23.95
CHOPFLIFTER	23.95
SERPENTINE	23.95
ZAXXON	26.95
CANYON CLIMBER	19.95
SARGON II	23.95
ZORK I	26.95
ZORK II	26.95
ZORK III	26.95
DEADLINE	32.95
STARCROSS	32.95
SUPENDED	19.95
CASTLE WOLFENSTEIN	23.95
FROGGER	19.95
JAW BREAKER	26.95
COSMIC BALANCE	26.95
REPTON	26.95
WAY OUT	19.95
CROSSFIRE	19.95
PREPPIE	19.95
BUG OFF	19.95
BUG ATTACK	19.95

### APPLE

JUMP JET	\$19.95
COSMIC BALANCE	27.95
ZORK I	26.95
ZORK II	26.95
ZORK III	26.95
DEADLINE	33.95
STAR CROSS	26.95
SUPENDED	33.95
WIZARDRY	33.95
KNIGHT OF DIAMONDS	23.95
LEGACY OF LLYLGAMYN	26.95
CHOPFLIFTER	23.95
ARCADE MACHINE	39.95
AE	23.95
BUG ATTACK	19.95
AZTEC ADVENTURE	26.95
CANYON CLIMBER	19.95
SARGON II	26.95
CASTLE WOLFENSTEIN	19.95
CAVERNS OF FREITAG	19.95
CANNONBALL BLITZ	26.95
ROBOT WAR	26.95



CALL OR WRITE TODAY!



### APPLE

FLIP OUT	\$19.95
REPTON	26.95
GERMANY 1985	39.95
MINER 2049er	26.95
COSMIC BALANCE NEW!	26.95
MICROWAVE NEW!	23.95
BANK STREET WRITER	46.95
KNOW YOUR APPLE IIE	16.95
ZOOM GRAPHIC	32.95
SUPER DISK COPY	19.95
SCREEN WRITER II	81.95
SENSIBLE SPELLER	78.95
DICTIONARY	64.95
PRONTO DOSS	19.95
DOSS BOSS	15.95
ALPHA PILOT	26.95
APPLE MECHANIC	19.95
VISICALC 3.3	164.95
MAGIC WINDOW II	94.95
HOME ACCOUNTANT	49.95
BAG OF TRICKS	26.95
DOUBLE TAKE	23.95



# FAS-TRACK COMPUTER PRODUCTS

Box 456 • Columbus, Ohio 43216 • 24-HOUR PHONE ORDERS (614) 863-1699

Personal checks allow 2 weeks. We accept Visa & MasterCard (send card no. & expiration date). Include \$2.00 for shipping. Ohio residents add 5 1/2% state sales tax. Prices reflect a cash discount only & are subject to change without notice. Please enclose your phone no. with your order.

CIRCLE 144 ON READER SERVICE CARD



## Home Security With the Eye

Moving into our own home after living in government housing for several years, one of our first concerns was a home security system. Since I had purchased a BSR remote controller and some lamp modules from Radio Shack, I needed a system that would interface with that system. After considering several commercial systems and thinking about designing my own, I decided to purchase the Eye, manufactured by Lehigh Valley Computer Corporation.

Since it is a new product, and I live in a remote location, I had only the company's brochures to go by. Their system has several features that prompted my decision. The Eye controller board plugs into one of the I/O slots of my Apple computer, providing a real-time clock capability apart from the security system. The Eye also provides the capability to control remotely up to 256 different strings of lights and appliances via the BSR modules. I decided to try it.

The package, which arrived by UPS in just a few days, contained the main controller card, four magnetic switches, a piezo-electric alarm, a 5 1/4" disk and a user manual.

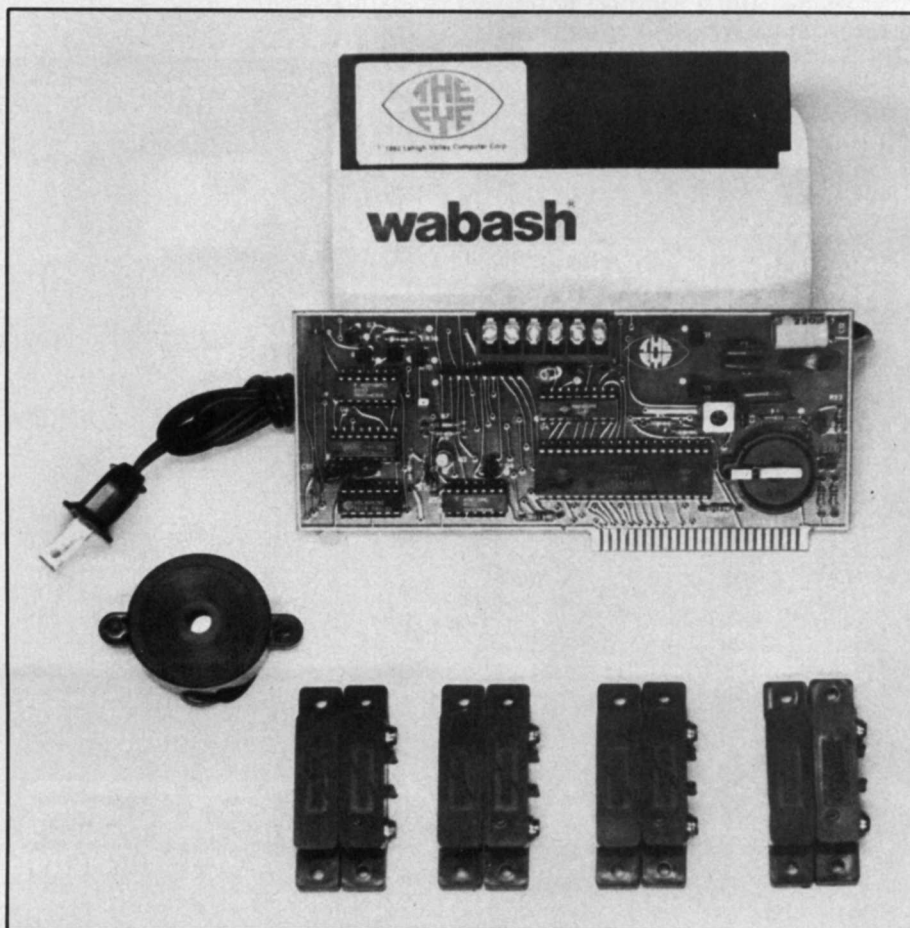
The controller uses a standard 50-pin edge card with six-foot power cord and a back-up battery. The board contains an OKI5832 Clock Generator chip, five other ICs, and a six-post terminal connector to tie in the remote sensing devices. The alarm looked like a toy, so I tossed it aside. The magnetic switches, the kind that are readily available at electronic stores, consist of two parts—a magnet and the actual switch, closed when the magnet is near and open when the magnet is removed. This makes it a handy device to detect an open door or window.

### *Otto Moyen-van Slimming*

I inserted the disk into the drive, hit the power-on switch and the Eye came up with a menu. I hit RESET and quickly made several back-up copies of the software (completely unlocked and mostly in Basic).

### User Manual

The manual consists of a bound volume of 30 typeset pages. The manual briefly explains the system and provides several examples of system implementations ranging from a basic system to a deluxe version with all the bells and whistles. It also covers the operation of the real-time clock and the remote BSR controller. The illustrations



Otto R. Moyen-van Slimming, 3350 Via Dona, Lompoc, CA 93436.

## CABLES

ATARI PARALLEL	34.99
BASIS 108 PARALLEL	39.99
DTC	49.99
EPSON QX-10 PARALLEL	44.99
IBM PARALLEL	44.99
KAY PRO PARALLEL	34.99
MALE TO MALE RS232	24.99
OSBORNE PARALLEL	34.99
TI 99/4A PARALLEL	34.99

## Novation

APPLE CAT II	295.99
APPLE CAT 212	
AUTO CAT 212	579.99
CAT	159.99
D-CAT	169.99
J-CAT	119.99
SMART CAT 103/212	459.99

## BASIS

**TWO DRIVES**  
**128K 3.0 CP/M**  
 DIAGNOSTIC CONTROLLER  
 CALL FOR LOWEST PRICES

## SOFTWARE

BEAGLE BROS.	
ALPHA PLOT	24.99
APPLE MECHANIC	19.99
DOS BOSS	15.99
DOUBLE TIME	21.99
FLEX TEXT	19.99
PRONTO DOS	19.99
TYPEFACES	14.99
UTILITY CITY	19.99
BPI (GL,AP,AR,INV) ea.	299.99
BRODERBUND	\$Call
COPY II P.C. OR PLUS	29.99
DARK CRYSTAL	25.99
HOME ACCT (APPLE)	44.99
HOME ACCT (IBM)	99.99
HOME ACCT (OSBORNE)	59.99
MAGICALC	139.99
SCREEN WRITER II	89.99
STATE OF THE ART	\$Call
SUSPENDED (A,IBM)	29.99
VISICALC (APPLE)	169.99
VISICALC & CDEX (IBM)	179.99
VISIWORD & VISISPELL	\$Call
ZAXXON (AP, AT)	\$Call
ZORK I,II,III (A,IBM)	24.99

## MONITORS

BMC 9191 12" Color	299.99
Taxan RGB I Color	319.99
Taxan RGB III Color	539.99
Taxan 12" Amber	134.99
Taxan 12" Green	129.99
USI 1400 12" Color	329.99
USI Pi1	99.99
USI Pi2	145.99
USI Pi3	149.99
USI Pi4	129.99

## PRINTERS

BMC HR-1	749.99
BROTHER HR-1	799.99
DTC 380 Z	1195.99
EPSON (ALL MODELS)	\$Call
GEMINI 10	299.99
GEMINI 15	429.99
OKIDATA 82A	379.99
OKIDATA 83A	649.99
PROWRITER II	629.99

## HARDWARE

ALS CPM 3.0	\$Call
APPLE EXT 80 COL CARD	219.99
BUFFER BOARD	139.99
DRIVE CONTROLLER	69.99
FINGERPRINT (MX-PLUS)	44.99
GRAPPLER+	119.99
HAYES SMARTMODEMS	\$Call
IN LINE MICRO BUFFER 32K	249.99
MICROBUFFER	129.99
MICROMODEM II	269.99
MICROMODEM II W/TP	299.99
MOCKING BOARD	\$Call
MONTECARLO CARD 64K	359.99
MX 80 RIBBONS	4.99
PARALLEL INTERFACE (APPLE)	69.99
PAYMAR L/CASE REV. 7	19.99
PKASO GRAPHICS CARD	139.99
PLANTRONICS COLOR CARD	
w/Draftsman Software (IBM)	389.99
SERIAL INTERFACE (A)	99.99
16K RAM CARD	39.99
SNAPSHOT TWO	99.99
SOFTCARD	239.99
USI RF MODULATOR	49.99
WILDCARD	109.99

## MOUNTAIN COMPUTER

A/D - D/A	269.99
CABLES	\$Call
CLOCK	195.00
CPS CARD	159.00
EXPANSION CHASSIS	559.00
MUSIC SYSTEM	299.00
RAMPLUS 32K	145.00
ROMWRITER	145.00
SUPERTALKER	149.00

## Videx

ENHANCER II	99.99
FUNCTION STRIP	56.99
PSIO	179.99
SOFTWARE	\$Call
ULTRATERM	\$Call
VIDEOTERM	199.99
VIDEOTERM w/ss & inv	229.99

## KENSINGTON MICROWARE



### SYSTEM SAVER

- Surge Suppression
- Dual Outlet
- U.L. Listed
- Fits Apple Stand

**\$65**

## Verbatim

5 1/4" SS/DD/SS (100)	239.00
5 1/4" SS/DD/SS (10)	25.95
8" SS/DD/SS (10)	39.00
8" DS/DD/SS (10)	45.00

## DRIVES

APPLE BRAND	299.99
4th DIMENSION	239.99
MICRO SCI A2	249.99
SUPER 5 DS/DD (IBM)	269.99

## BOOKS

APPLE USERS GUIDE	12.99
BLUE BOOK (APPLE)	19.99
COMPUTER BUYERS GUIDE	15.99
SOFTWARE 1983 GUIDE (A, AT)	14.99

## SATURN SYSTEMS

64K	279.99
128K	399.99
Accelerator	\$Call

## GAME I/O

APPLE PADDLES	9.99
GAMEPORT III	69.99
KRAFT:	
JOYSTICK	47.99
JOYSTICK (AT, COM)	15.99
PADDLES	29.99
PADDLE-A-DAPPLE	24.99
PARADISE PORT	24.99
TG:	
JOYSTICK IBM:	45.99
JOYSTICK II	47.99
PADDLES	29.99
SELECT-A-PORT	47.99

## SMITH-CORONA TP-1



**\$499<sup>99</sup>**

## QUADRAM

E-RAM (APPLE)	139.99
MICROFAZER	\$Call
QUADBOARD 64K	299.99
QUADBOARD 256K	499.99
QUADCHROME MONITOR	\$Call
QUADLINK	\$Call

## POWER STRIP

W/SURGE  
 PROTECTION  
**\$25<sup>00</sup>**



- No Charge for Credit Cards
- Prices Subject to Change Without Notice
- Min. \$4.00 Shipping Charge
- All Orders FOB San Jose
- Purchase Orders Welcome
- Call for Terms First



## COMPUTER DISCOUNT PRODUCTS

MAIL ORDERS & RETAIL STORE  
 860 S. Winchester Blvd.  
 San Jose, CA 95128

**(408) 985-0400**

HOURS: MON-FRI 8AM-5PM - SAT & SUN 10AM-4PM  
 CIRCLE 122 ON READER SERVICE CARD



## The Eye, continued...

are hand drawn, but adequate; there are no photographs. I was satisfied with the quality of the documentation.

Following the installation instructions, I installed the controller card in slot #4, connected the piezo-electric alarm, plugged the connector into an AC outlet and booted the system.

### System Operation

The Eye provides the capability to monitor three separate detection circuits via three channels: X, Y, and Z, so the house or building being protected can be divided into three zones. For example, channel X could monitor the doors, channel Y the windows and channel Z pressure sensitive mat switches, providing both peripheral and interior security (see Figure 1).

Each channel can monitor only switches of the same type, i.e., normally open (N/O) or normally closed (N/C). All N/C switches must be wired in series while all N/O switches must be wired in parallel, forming a loop for each channel. This ensures that a single switch will trigger the alarm function of the Eye. The system allows you to specify which channels are to be monitored and the type of switches in the loop of each channel.

The system operates in two modes—foreground and background. In the foreground mode, the Apple is totally dedicated to the Eye. The Applesoft Basic program, called Eye, runs continuously, monitoring the channels that are active, turning lights and appliances on and off, and even turning itself automatically on or off at specified times. The current time and system status is displayed on the screen.

The Eye provides an alarm or controls lights and appliances only when it is active. You can activate the system manually or the Eye will do so automatically. In the manual mode, the system becomes active five minutes after you command it to activate, thereby giving you five minutes to get out of the house or the building before the system is armed.

The Eye also can be programmed to activate or de-activate itself at a specific time (only two ON and two OFF time in a 24-hour period). You would use this mode if you wanted the system to be active during the same period each day. For example, the last employee of a store leaves at 9:00 p.m., so the Eye is programmed to become active at 21:05 (all times are based on a 24-hour clock) and to turn itself off at 7:55, just before the owner arrives to open the store.

Note that selecting the automatic mode from the menu when the Eye is programmed to be active will arm the system immediately, without the five-

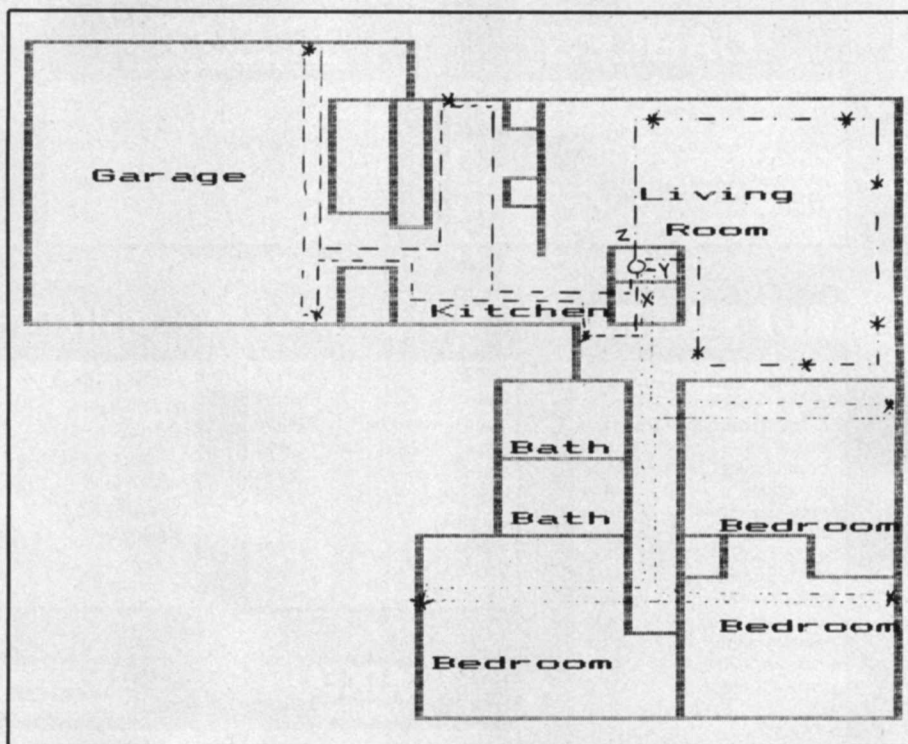


Figure 1.

minute delay provided by the manual mode. Thus, if the system is programmed to activate at 6:00 p.m. and de-activate at 6:00 a.m., selecting the automatic mode at 10:00 p.m. will prevent you from leaving by an alarmed door without setting off the alarm.

The system allows you to specify the delay time between the detection of an intrusion and the time it actually gives the alarm. This time is variable, giving you any amount of time to enter while the Eye is active and de-activate the system before it turns on the siren and calls the police.

The system can be interrupted by a CTRL-C. This puts the Eye in the background mode, provided that the system was active when background was selected. In this mode the system does not read the real-time clock, so its timed functions do not operate, except for the entry delay. If any channel signals a change in state, indicating an alarm condition, however, the Eye will initiate an interrupt on the Interrupt ReQuest (IRQ) line to the Apple CPU. The programmed alarm functions (e.g., sounding the siren) are then executed.

If you are running a program while the Eye is active in background and don't want to be interrupted, you should set the Interrupt Disable flag in the Status (P) register. However, this effectively de-activates the Eye. Note also that to protect the background program, HIMEM must be set at 32624 before a foreground program is run.

### Using the System

Figure 2 shows the menu options provided by the Eye program. First, since the clock had been set to Eastern Standard Time, I used option A to turn the clock back three hours to conform to Pacific Standard Time. The light next to my computer is controlled by a remote BSR module, so I tried the light timer next. After setting the house code using option B, I selected the light timer option. I set the timer to turn the light on in two minutes and turn it off one minute later. I then instructed the program to activate the timer. The Eye informed me that the timer had been activated and advised me to turn the screen off.

At the appointed time the Eye wrote the message CHANNEL 1 ON to the screen, beeped and turned on the light. "It works," I thought. Then the message was repeated, followed by another beep.

- A. SET CLOCK / READ CLOCK
- B. DEFINE HOUSE CODE
- C. DEFINE SWITCHES AS N/O OR N/C
- D. DEFINE ENTRY DELAY TIME
- E. DEFINE EYE AUTO ON-OFF TIMES
- F. STATUS OF DETECTION SWITCHES
- G. ACTIVATE EYE AND LIGHT TIMER
- H. ACTIVATE LIGHT TIMER ONLY

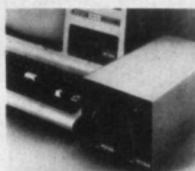
Figure 2. The Eye Menu.

# the ACCESS UNLIMITED MICRO SHOPPING CENTER

## PERCOM™ HARD DISK DRIVES FOR IBM-PC™, APPLE™, TRS-80 MODELS I, II, III™

5 megabyte  
5 megabyte, add-on  
10 megabyte  
10 megabyte, add-on

Only \$1395.00  
Only \$1295.00  
Only \$1795.00  
Only \$1695.00



## PERCOM™ FLOPPY DISK DRIVES FOR: TRS-80 MODEL I™ — With FREE DOSPLUS 3.4™

Single sided/Double density, single unit  
Single sided/Double density, dual unit  
Double sided/Double density, single unit  
Double sided/Double density, dual unit

Only \$275.00  
Only \$500.00  
Only \$350.00  
Only \$650.00

## TRS-80 MODEL III™ — WITH FREE DOSPLUS 3.4™

Single sided/Double density, single unit (internal)  
Single sided/Double density, dual unit (internal)  
Double sided/Double density, single unit (internal)  
Double sided/Double density, dual unit (internal)

Only \$449.00  
Only \$699.00  
Only \$560.00  
Only \$860.00

## ATARI™

Single sided/Single density, first drive  
Single sided/Double density, first drive  
Double sided/Double density, first drive

Only \$475.00  
Only \$559.00  
Only \$679.00

## IBM-PC™

Single sided/Double density, single unit (internal)  
Single sided/Double density, dual unit (internal)  
Double sided/Double density, single unit (internal)  
Double sided/Double density, dual unit (internal)

Only \$279.95  
Only \$529.95  
Only \$359.95  
Only \$699.95

## PC POWER PACK FOR IBM-PC™

A joint venture of Digital Research, Inc. and Percom Data Corp.  
• Percom Data Hard Disk Drive • 192K RAM Board and Controller  
• Digital Research Concurrent CP/M-86™ Operating System

Three Part Pkg. — ONE GREAT PRICE! SMB \$2495.00 10MB \$2795.00

## THE AMAZING iBEX 7202

**THE POWER OF A BUSINESS COMPUTER  
AT A PERSONAL COMPUTER PRICE!  
YOUR PRICE \$2595<sup>00</sup> TOTAL**

This computer features dual 8-inch double-sided, double-density floppy disks, with the format software selectable. Because it supports the IBM 3740 industry-standard format, as well as double-density, data exchange with most other computers is possible.

• Easy-to-read video screen with high contrast green phosphor • Selectable 40, 80, or 132 characters to display a full width report • Programmable cursor control, high-speed scrolling, and other video attributes • Industry-standard parallel interface for printer • Serial interface hardware (async., bisync., etc.) • More available user memory because ROMs and video refresh are bank-switched out • Memory parity check • Floppy disk capacity 2.4MB • Winchester hard disk available • A battery-driven clock/calendar • Strong, compact, and styled for the office environment • CP/M® operating system and MBASIC language included

**PLUS BIG DISCOUNTS ON SOFTWARE!** With iBEX Purchase

	Reg. Retail	With iBEX
WORDSTAR	\$495.00	\$330.00
MAILMERGE	\$250.00	\$175.00
SPELLSTAR	\$250.00	\$175.00
DATASTAR	\$295.00	\$210.00
CALCSTAR	\$145.00	\$105.00

## ADSTM BUSINESS SOFTWARE:

### Verticals

Contract Services, Private Clubs, Retail Florist, Churches . \$895.00 ea.

### Accounting

Invoicing — A/R — Inventory . \$895.00  
G/L, A/P, Payroll . . . . . \$495.00  
Invoicing — A/R . . . . . \$585.00

**CALL!  
For Low  
Package  
Price**

## BIG DISCOUNTS ON PRINTERS!

New BROTHER HR1™  
MICROPRISM™  
C. ITOH F-10™  
TRANSTAR 130™  
TRANSTAR 140™  
OKIDATA™ — All Models  
STAR MICRONICS™

Your Price — Only \$ 980.00  
Your Price — Only \$ 699.00  
Your Price — Only \$1495.00  
Your Price — Only \$ 895.00  
Your Price — Only \$1695.00  
**Call For Low Price!  
Call For Low Price!**

## SIGNALMAN™ MODEMS From Only \$99.00 All with FREE Source™ Subscription Service!

## MEDIA FOR LESS

SENTINAL™ complete with hub rings & lifetime limited warranty.

Single sided/Single density 5¼"	\$18.70 bx of 10
Single sided/Double density 5¼"	\$20.70 bx of 10
Double sided/Double density 5¼"	\$27.80 bx of 10
Single sided/Double density 8"	\$29.70 bx of 10
Double sided/Double density 8"	\$38.70 bx of 10

## BUY DISKETTES IN BULK AND SAVE \$\$\$\$

Single sided/Single density 5¼"	\$179.00 case of 100
Single sided/Double density 5¼"	\$190.00 case of 100
Double sided/Double density 5¼"	\$225.00 case of 100
Single sided/Double density 8"	\$280.00 case of 100
Double sided/Double density 8"	\$340.00 case of 100

BASF™ 5¼" Single Sided/Double Density  
Lifetime Limited Warranty. Reg. \$44.95  
5¼" Double Sided/Double Density —

Now \$24.90 bx of 10  
Now \$34.95 bx of 10

## PERFECT DATA™ HEAD CLEANING KIT

### FILE MINDER™

Smoked acrylic, flip-top box, holds 75 diskettes

Your Price — \$19.95

Only \$24.95

\* Reg. Trademarks • Limited Time Offer/Limited Quantities • Prices subject to change without notice • Prices do not include state taxes



**1 (800) 527-3475**



Order by phone or by mail. We accept Visa, MasterCard, cashier's checks, certified checks, and money orders. With personal checks, allow additional time for bank clearance. Your bankcard will not be charged until your order is shipped. On orders over \$1,000, we pay freight (surface only) and insurance; please add \$3.00 shipping and handling under 50 lbs. Over 50 lbs., add \$5.00 for orders under \$1,000.00. Texas residents add 5% sales tax. Allow 2 to 4 weeks for delivery.

☐ Please send me a FREE catalog. I'm not ready to order at this time.

Name \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone Number (\_\_\_\_) \_\_\_\_\_

Quantity	Item	Unit Price	Subtotal

Check one: State Sales Tax (Texas residents only)

☐ payment enclosed ☐ handling charge

☐ Visa ☐ MasterCard\* ☐ Total

\_\_\_\_\_

\*If Master Card, numbers above name: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Authorized signature, if charged \_\_\_\_\_

**ACCESS UNLIMITED**

DEPT. L-4/401 N. Central Expwy./Richardson, Texas 75080  
Tel. 1-800/527-3475 214/340-5366  
214/690-0207 — Sat. and Evenings Only

## The Eye, continued...

Another message and another beep. I turned the Apple off, popped the lid and checked the connections. Nothing seemed wrong, but I pulled the card and reseated it. I rebooted the system, reprogrammed the light timer: activate, message, beep, message, beep, message, beep. After 18 messages and 18 beeps, the message CHANNEL 1 OFF was displayed. Then a beep, and the lights went out, followed by 18 messages and 18 beeps.

The constant number gave me a clue to the problem. I listed the program and my suspicion was confirmed. The program checks the time and cycles through each of the 16 channels to see if the channel needs to be activated. The software checks only the hour and minute, however, so the first instance that the time is correct, it sends the turn-on code to the BSR module, prints the message and beeps. It then checks the other channels, and when it returns to the first channel, about three seconds later, the time still is correct, so it goes through the same process and continues until the minute number increments.

Thanks to the unlocked software, I was able to solve the problem easily with a bit of re-programming.

Turning to the alarm system, I hooked up one of the magnetic switches to channel X. Holding the switch in one hand and running through the menu, I activated the Eye. I slowly moved the two sections of the switch apart and the alarm went off. The sound was definitely louder than the Apple beep, but I doubt that it would wake me from a sound sleep. Nor do I think it would scare a self-respecting burglar. I plan to add a siren.

I tried the system in both fore- and background modes, activating both

***I doubt that it would wake me from a sound sleep. Nor do I think it would scare a self-respecting burglar.***

manually and automatically. It all worked by the book. Having completed the bench test, I began to put the system to work by stringing a wire to the front door and mounting the switch. I ran into a problem, since the door is recessed in the frame and the magnet part has to be within  $\frac{1}{2}$ " of the switch part. I found that a part of the frame had warped slightly, allowing just enough room to mount the switch without interfering with the opening or closing of the door. If you should face the same problem, there are smaller switches available that will fit into tight places.

Once again I ran through the tests, but just as I became convinced that the system was working perfectly, the alarm went off although the door had not been opened. I checked all the connections, ran a few resistance checks—everything looked good. I rebooted the system and after a few minutes of perfect operation, another false alarm. This time I noticed that the lights had flickered slightly. I tried to cause a false alarm by wiggling the wires, pounding on the door, and turning lights and appliances on and off without success. Finally, as the refrigerator kicked in, another false alarm occurred.

I recalled information in the user manual on electrical noise triggering the

Eye. There it was, the problem and the solution—an RC filter, using a 470 ohm resistor and a .01 mfd capacitor, should solve my problem, according to the manual. After a quick trip to Radio Shack, I tried the fix. After several minutes, another false alarm. The fix had not worked.

Checking and rechecking showed nothing wrong. I had started to tear out my hair when my wife entered with a box of electronic parts and suggested that something in there might be what I needed. Suppressing the urge to give her a crash course in electronics theory, I looked at various ICs, transistors, resistors, and other junk until I happened to see a 10 mfd electrolytic capacitor. Figuring that I had nothing to lose, I hooked it up and it worked!

Since putting in the fix, the system has worked exactly as the documentation says it should. With the system activated, if anyone triggers the alarm, the Eye immediately turns on all lights using BSR channel 15. This serves as a welcome light to members of the family coming home or as a warning to a burglar. If the system is not de-activated within the selected delay time (either by a RESET or simply by turning the computer off), the Eye turns on all other lights controlled by BSR modules, sounds the piezo-electric alarm and activates the phone dialer if one is connected. It will also send another signal using BSR channel 16 to turn on the optional siren.

The Eye survived several power failures. The back-up battery kept the real-time clock alive. After the power returned the disk in drive 1 rebooted the Eye which then picked up where it had left off. If the schedule called for the Eye to have activated itself during the time

## Patch to Remove Beeps

Use the following procedure if you want to get rid of the beeps:

**Warning:** Make changes to a back-up copy first, until you are sure the program is working correctly.

1. Hit RESET and type BLOAD TRANSMIT.
2. Get into the Monitor by typing CALL -151.
3. Type 8142.8145. You should see 8142 - 20 DD FB 60 on your screen. This is the JSR to the Monitor BELL2 subroutine.
4. Type 8142:60 EA EA EA. Repeat step 3 and you should see 8142 - 60 EA EA EA. This changes the JSR to an RTS.

5. Type BSAVE TRANSMIT, A\$80E0, L\$D0.
6. Type RUN EYE and check the light timer program to verify that the beeps are no longer there.

If you don't want to see 18 copies of the same message, use the following procedure:

1. Hit RESET and type LOAD EYE.
2. Type in the following lines:

```
10 DIM CN(16), CF(16)
4530 IF (HR + MI / 100) < > (TT(1,X) + TT(2,X) / 100)
    THEN CN(X) = 0: GOTO 4600
4532 IF CN(X) THEN 4600
4535 PRINT "CHANNEL ";X;" ON": CN(X) = 1
4600 IF (HR + MI / 100) < > (TT(3,X) + TT(4,X) / 100)
    THEN CF(X) = 0
4602 IF CF(X) THEN 4600
4605 PRINT "CHANNEL ";X;" OFF": CF(X) = 1
3. Type LIST 10: LIST 4530,4605 to check that the lines are
   entered correctly.
4. Type SAVE EYE.
5. Type RUN EYE and check that the system operates
   correctly.
```

Note: if you don't mind one beep when a channel is turned on or off, just make the changes to the program only and leave Transmit unmodified.

of the power outage, it did so immediately after the power returned.

### Evaluation

Overall I am very satisfied with the Eye. The installation is not too difficult, and the manual seems to have covered all the bases. I would have appreciated a more detailed technical explanation of both hardware and software, but I expect that most people purchasing this system will not require such details.

There are a few troublesome aspects of the system, however. The RC filters should have been included on the board or space should have been allowed for them because other users also may have problems with spikes. The location of the capacitors that I installed to solve the problem could interfere with a card in slot 5.

The location of the terminal strip at the top, close to the Apple cover, may cause an accidental short (I used electrical tape to prevent this). The side facing the back of the Apple might have been a better location for the terminal strip. In addition, the terminal posts, especially the grounding terminal, are small, making it difficult to connect stranded wires. These are minor flaws in an otherwise good design.

A flaw in the software is the limit on the scheduler. The present system allows only one on-off cycle per BSR channel in a 24-hour period. Also, there are no provisions for programmed changes to the schedule, i.e., each day is identical to its predecessor. For example, you cannot specify that the TV comes on at 8:00 p.m. on Wednesday and at 7:00 p.m. on Thursday, or that you want the bathroom light to go on and off three times during the evening.

The ability to introduce an optional random factor, say  $\pm 15$  minutes, to the turn-on/off times would be a good feature to add, as would be the ability to control the start of a sequence based on input from an optical sensor measuring the amount of light outside. The Eye also fails to take advantage of the ability of the BSR system to dim or brighten individual lights.

Another limitation is having to install the controller in slot 4. This is necessary because all the PEEKS and POKES needed to access the card are hardcoded to slot 4 addresses, but it may conflict with other cards which require installation in that slot. The system would be more flexible if you could specify in which slot you had installed the controller.

I intend to make software changes to provide these additional capabilities and I would be interested in hearing from readers who have made custom changes.

In general, the real-time clock works well with programs running under DOS,

but there are no provisions to use the clock in Pascal or CP/M. To protect the clock routine from being overwritten, HIMEM must be set almost 6K lower than its value after boot-up (32624 vs. 38400). If you run the Eye in background and run a fairly large AppleSoft program with hi-resolution graphics, you may find that the Apple spends an inordinate amount of time "garbage collecting," because of the small amount of memory left over for strings. If you use the clock function in your own programs, be aware that the manual has reversed the memory locations for hours: Location 32740 contains the "ones" and 32741 the "tens" of hours.

Commercial software packages, using modified operating systems, are gen-

## *The Eye is an attractive alternative to other commercial security systems for Apple owners.*

erally not compatible with the Eye, as they tend to destroy any program in background. Since the IRQ interrupt line is usually not masked, however, you may see some unpredictable effects if the system is triggered. You might have to resign yourself to the fact that you cannot play *Frogger* and feel secure at the same time.

### Summary

Aside from some limitations, the Eye is a quality product and an attractive alternative to other commercial security systems for Apple owners. Atari and Vic 20 versions of the Eye should be available soon from Lehigh Valley Computer. The system is relatively easy to install, and all options are menu-driven. Unless you accidentally set off the alarm at 2:00 a.m. and your neighbor comes over to punch you in the nose, it is very hard to get into trouble. When all else fails, a RESET cures all. The basic package sells for \$250.

I plan to test some of the optional accessories that interface with the Eye, such as window breakage detectors, heat detectors, ultrasonic motion detectors, mat switches, and a phone dialer. I am going to have fun rewriting the existing code to provide additional features. This capability alone is worth the price of the package.

Lehigh Valley Computer Corp., 523 S. Clewell St., Bethlehem, PA 18015. (215) 868-1303. ☐

CIRCLE 421 ON READER SERVICE CARD

## Add 3-D to your VISICALC®

(No, it's not a new graphics package.) Now, you can get a consolidation system for your VisiCalc program that lets you combine multiple VisiCalc 'pages', and there's no need to learn a new system!

- Perform Hierarchical Consolidations
- Perform Time Period Roll-Ups
- Ask "What If" at Multiple Levels
- Customize Report Formats
- Word Processor Interface

# VIZ-A-CON™

See your software dealer, or order directly from ABACUS ASSOCIATES, (713) 666-8146, 6565 W. Loop S., Suite 240, Dept. 1, Bellaire, TX 77401

Visa/Mastercard, Call Toll-Free (800) 547-5995, ext. 170

Apple II, II+, IIE, TRS-80 I, III...\$ 99.95 + 3.95 S&H  
Apple III, TRS-80 II 12.16, IBM PC...\$139.95 + 3.95 S&H

DEALER INQUIRIES INVITED

CIRCLE 102 ON READER SERVICE CARD



## LOOK NO FURTHER FOR THE BEST MEDIA AND RIBBON PRICES!

**VERBATIM** Verex MD-200-01 ... 2.25 ea.  
Datalife MD-525-01 ... 2.55 ea.  
Datalife MD-550-01 ... 3.65 ea.

**WABASH** Single Side Single Density ..... 1.85 ea.  
Single Side Double Density ..... 2.15 ea.  
Double Side Double Density ..... 3.10 ea.

**BULK** Single Side Single Density ..... 1.60 ea.  
Single Side Double Density ..... 1.95 ea.  
Double Side Double Density ..... 2.65 ea.  
Tyvec Jackets Available w/order ..... .10 ea.

**EPSON** MX-80 ..... 6.00 ea.  
MX-100 ..... 9.75 ea.

**5¼"** Flip File Box (Holds 80 Disks) .... 19.95 ea.

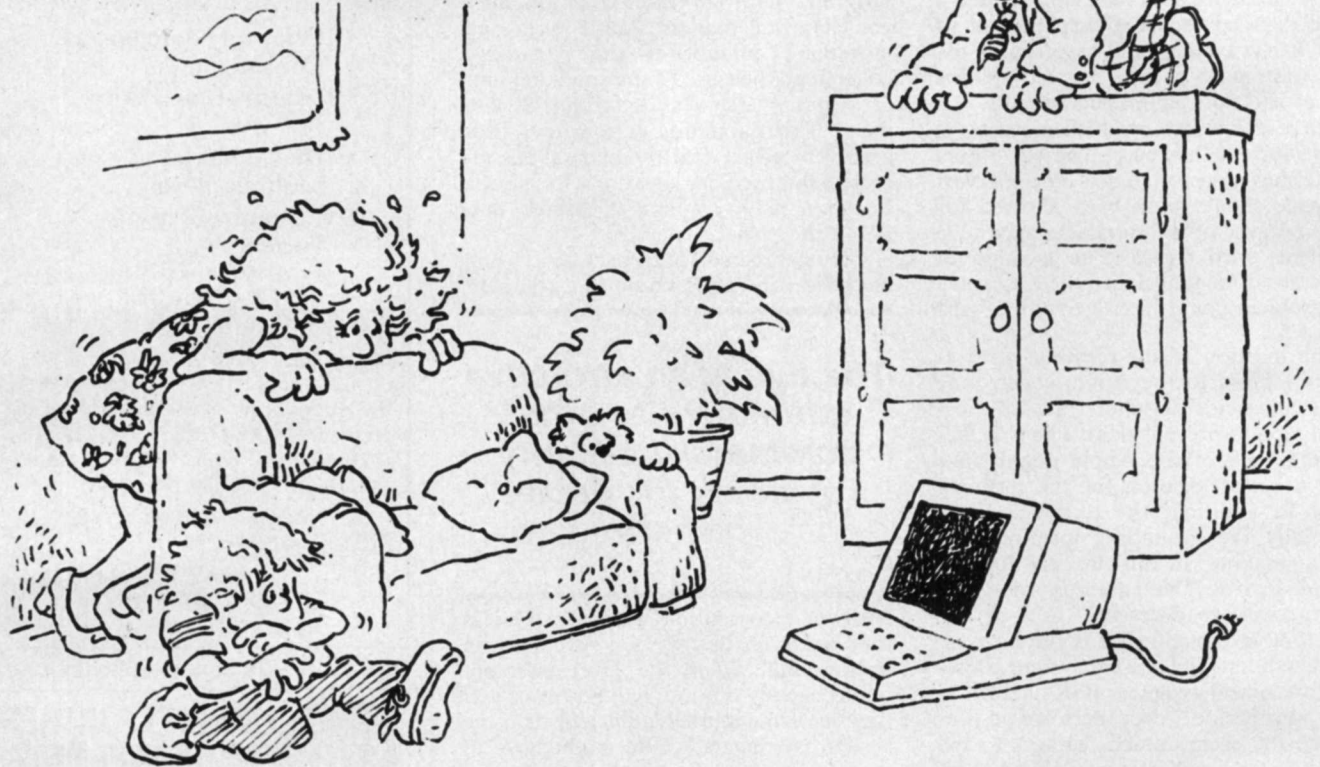
TAKE THE GREEN LIGHT TO DISCOUNT DATA

**CALL 1-800-322-DATA**  
**DISCOUNT DATA SUPPLY**  
P.O. BOX 02183  
PORTLAND, OREGON 97202

Shipping & handling charge \$3.00. Send certified check / money order / cashiers check for same day shipping. Use VISA / Mastercard add 3 percent. Personal check allow 3-week delay for bank processing.

CIRCLE 229 ON READER SERVICE CARD

# THE HEARTBREAK OF CYBERPHOBIA



Illustrations by Wayne Kaneshiro

"What—me a cyberphobe?" You may scoff at the accusation. I realize you are reading a computer periodical, one, in fact, which usually makes the assumption that its audience feels quite comfortable around small computers. Yet a good deal of the material we present assumes advanced knowledge on the part of our readers.

In actuality many of our readers are in a more or less fledgling state when it comes to computers. They want to know more—they want to be comfortable with the material, but are finding it to be tough going. There is so much to learn, and so much prerequisite, that it is difficult to find a handle, to know where to begin. I remember how I felt the first time I ever leafed through the pages of *Creative Computing*; it was like nothing I had ever seen before. Although the words looked a lot like English, I was able to understand very little.

The people I wish to address here are in that beginner category. They may or may not own microcomputers. They are making an effort to educate themselves, but are intimidated, whether or not they openly admit it. Intimidation, with its longtime partner, fear, are extremely effective blockers of learning. My goal

---

## John J. Anderson

---

here is to loosen their hold. Even if you are on intimate terms with one or more CPUs, you may find the following to be of interest.

### Of Mainframes and Myths

Let's step back a little, and attempt to gain a long range view.

Way back in April, 1969, *Psychology Today* addressed the question of the impending "computer revolution." It took stock of tools vs. tolls in the ascen-

---

***I remember how I felt  
the first time I ever  
leafed through the  
pages of Creative  
Computing; it was like  
nothing I had ever  
seen before.***

---

dency of the computer. We are still asking, and will be for some time, what price will be exacted from humanity, relying increasingly on computer guidance, as it courses headlong into the twenty-first century.

The prospects offered then were tinged with warnings, but rather cautiously cheerful overall. In the pages of that issue, B.F. Skinner and Dean Wooldridge unabashedly argued for the point of view that man is a machine.

Marvin Minsky tackled optimistically some of the philosophical and engineering problems in the modeling of intelligence. Isaac Asimov went so far as to say that "the human brain is made up of a finite number of cells of finite complexity, arranged in a pattern of finite complexity. When a computer is built of an equal number of equally complex cells in an equally complex arrangement, we will have something that can do just as much as a human brain can do to its uttermost genius."

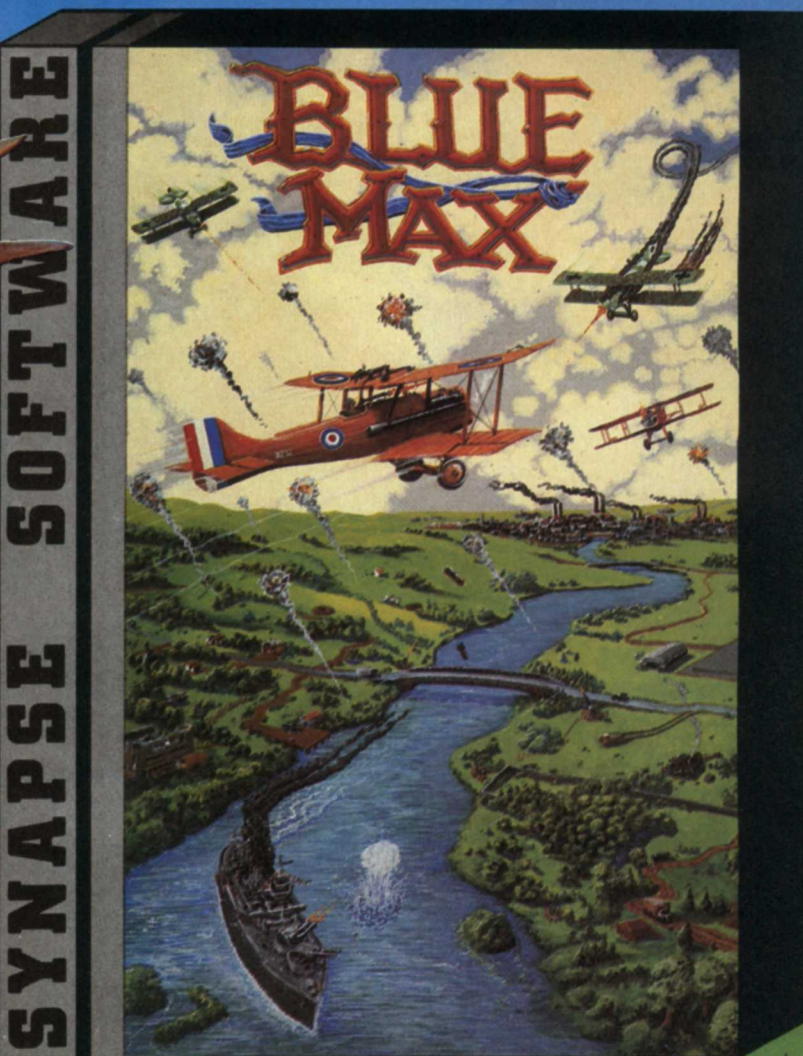
Those are the kinds of assertions that evoke, unknowingly and unintentionally, grave consternation among the cyberphobic.

Asimov, in a follow-up piece, spoke of the "Frankenstein Complex," which he

DIAGONAL SCROLLING...GROUND-TO-AIR FIRING...3-D STRAFING RUNS

# SOMEBODY FINALLY DID IT RIGHT!

**BLUE MAX™** by Bob Polin takes you back to World War I, with 3-D scrolling the other games only wish they had.



**BLUE MAX™**, at software dealers everywhere, or **AVAILABLE DIRECT, FROM SYNAPSE ELITE, ONLY \$34.95** plus \$2 shipping & handling. Send check, money order or your **VISA/MASTERCARD** number to **SYNAPSE ELITE**, or order by phone (415) 527-7712.

For the Atari® 400/800/1200



## synapse

5221 Central Avenue, Richmond, CA 94804 • (415) 527-7712

CIRCLE 214 ON READER SERVICE CARD



# LAST NIGHT WE EXCHANGED LETTERS WITH MOM, THEN HAD A PARTY FOR ELEVEN PEOPLE IN NINE DIFFERENT STATES AND ONLY HAD TO WASH ONE GLASS...

## **That's CompuServe, The Personal Communications Network For Every Computer Owner**

And it doesn't matter what kind of computer you own. You'll use CompuServe's Electronic Mail system (we call it Email™) to compose, edit and send letters to friends or business associates. The system delivers any number of messages to other users anywhere in North America.

CompuServe's multi-channel CB simulator brings distant friends together and gets new friendships started. You can even use a scrambler if you have a secret you don't want to share. Special interest groups meet regularly to trade information on hardware, software and hobbies from photography to cooking and you can sell, swap and post personal notices on the bulletin board.

There's all this and much more on the CompuServe Information Service. All you need is a computer, a modem,

and CompuServe. CompuServe connects with almost any type or brand of personal computer or terminal and many communicating word processors. To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

## **CompuServe**

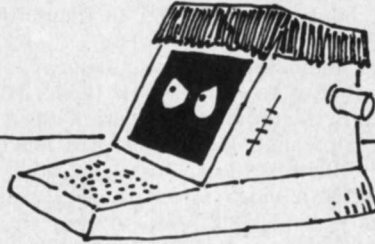
Consumer Information Service, P. O. Box 20212  
5000 Arlington Centre Blvd., Columbus, OH 43220  
**800-848-8990**  
In Ohio call 614-457-0802.

An H&R Block Company

CIRCLE 120 ON READER SERVICE CARD



**Apperception Without Apprehension**  
"Cyberphobia" is a term of growing usage, import, and incidence. Courses across the country now attract members, young and old, of a new and needful group: those willing but unable to understand much about computers, owing to a chronic anxiety concerning them. The term is no passing bit of Valspeak or computer jargon. It describes a tangible and often socio-economically debilitat-



coined as the generally accepted and deeply internalized notion that, as put forth in an occasional Late Show, some things were simply never meant for man to tamper with. He attempted to puncture the myth, but I got the strange feeling he had strengthened it with his earlier prediction concerning intelligent machines.

I have great respect and admiration for each of these authors, and in fact share their hopes for the future. But, with their unbridled predictions, they were certainly fueling the pyre at the time.

They can hardly be blamed for it—in 1969, there was a different perspective. One facet of this perspective was that computers were huge, unwieldy, unreliable nests of multimillion dollar spaghetti. It is not inconsistent that informed opinion, then, had grown so dramatically imposing as to nurture Promethean visions.

Today computers fit on the head of a pin, and while they still sometimes evoke images from Orwell, they are at least physically less forbidding. They are also encroaching upon us irrevocably, inexorably, and unceasingly. They sneak up on us in various forms we may not immediately recognize: they are in our toys, our tools, our timepieces. And today \$125 will buy the computer power that cost \$125,000 in April of 1969.

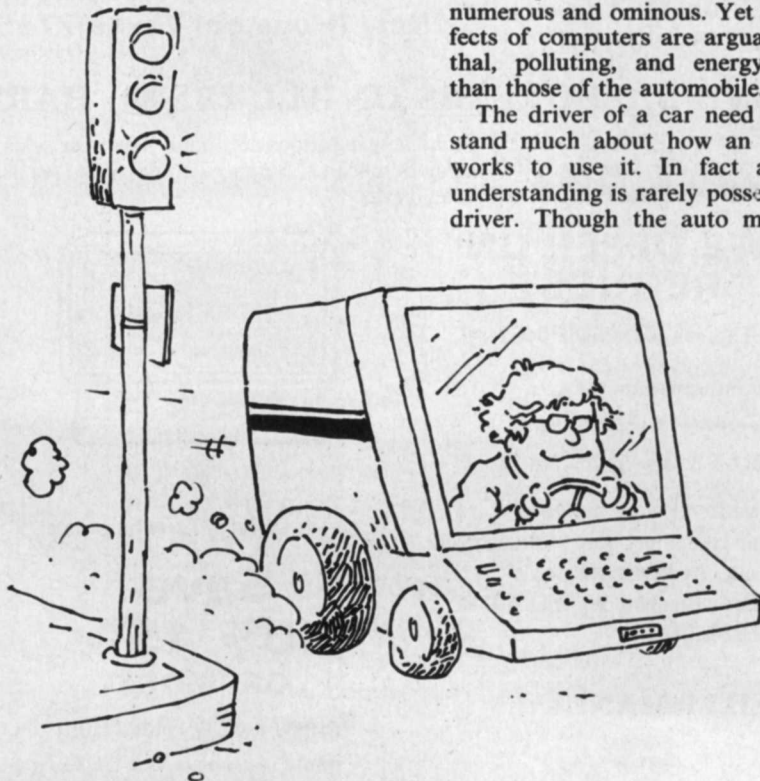
Doubtless, we must overcome our inhibitions concerning computers before we can effectively direct their proliferation. This is a lasting challenge to educators.

It is nonetheless clear now that educators themselves have done more to foster fear and trembling about computers than any group of axe-wielding Neo-Luddites. Even sane people (I include myself) have spent weak moments pondering whether and when the microwave oven was going to begin barking orders.

---

***Educators themselves  
have done more to  
foster fear and  
trembling about  
computers than any  
group of axe-wielding  
Neo-Luddites.***

---



ing malady. I, along with many others in the field of computers and education have worked to create programs that help cyberphobes break the grip of fear and gain some insight into a remarkable direction upon which the human race has lately embarked.

#### **His CRT Has Wipers**

When dealing with cyberphobia, a favorite analogy of mine concerns computers and cars; I have heard much criticism of the comparisons, but indulge them for a moment. The car is a lever of physical mobility. The computer is a lever of mental mobility.

The advent of the automobile radically altered our perspectives. The scope of our daily environment, as well as our grasp within that environment, was entirely redrawn. As its popularity grew and costs dropped, the alterations wrought by the car became permanent and unilateral. The changes have been changes for good and ill. The benefits are obvious, and undeniably, the gains have been strewn with lamentable compromise.

So it is with computers. They are swiftly changing the fabric of society as informational, educational, and recreational tools. These innovations will serve not only a technocratic elite, as has been suggested by some; they will be so cheap as to be readily available to all who desire them. They will become easier and easier to use. There exist already serious potentials for misuse; these are numerous and ominous. Yet the side effects of computers are arguably less lethal, polluting, and energy-dependent than those of the automobile.

The driver of a car need not understand much about how an automobile works to use it. In fact a thorough understanding is rarely possessed by the driver. Though the auto makers have

## Cyberphobia, continued...

done their best to obscure the fact, a car is less an end in itself than it is a means; it is used to reach some desired destination.

This is also true of the computer. The user can decide how much or how little to become involved with its internal workings. He may choose to learn little about the machine and still gain a great deal from its use.

Some people become disoriented when they think about computers because they make the mistake of asking what computers do, expecting a single answer. Computers are multi-purpose machines. In contrast to the cotton gin, butter churn, and safety pin, computers are designed with no sole, dedicated purpose in mind. Only upon execution of some certain and specific program will any "destination" be reached. The universality of the computer is in itself threatening—perhaps to some as threatening as being run over by a car, only more insidious. There are many different and subtle ways to be squashed, you see.

During those first experiences behind the wheel of a car, a learner experiences fear. This is natural, even necessary, to learn control and proper operation of a machine as powerful (and potentially dangerous) as an automobile.

Most important, there is but one way

## *The only way to conquer fear of computers is to get to know them.*

to overcome this fear: to drive. After many hours on the road, a modicum of confidence is obtained.

The only way to conquer fear of computers is to get to know them. My advice to the timid: sit in front of one as soon as possible. Remember, it is much more difficult to kill yourself or others staring at a video screen than peering out of a windshield, even in your first minutes at the console.

To judge computers without having touched one is like learning to drive by studying geography. And yet many people, especially and unfortunately otherwise intelligent people, have done just that. Until you sit down and start interacting with a computer, you have not even turned on the ignition, so to speak.

And knowing how to use computers is already as necessary a skill for many as knowing how to drive.

## Belletristic Computing

Some people have accused me of being obsessed with computers—of being in the worst case "cyberphenic" in my attitude. I deny this. My penchant for computers grows not from any compulsion to program or natural affinity for number crunching. On the contrary, I am a word-oriented person, disenfranchised in large part from the world of mathematics (as were many of my kind at an early age, no doubt as a result of archaic teaching methods). I am "right-brained," to further abuse a much-celebrated thesis.

No, I have no programmable calculator dangling from my belt, and the word "calculus" still induces weakness in my knees. I have always had trouble with long division, and though I greatly admire the unshakable foundations of the hard sciences, I will usually skip the math, taking the theorist's word that the results invariably fit the facts. And that is one reason I love computers. They do my math for me.

The microcomputer, for me and a growing number like me, is not an end in itself. It is a means to an end. The creative potential of the micro is in a sense limitless and certainly goes far beyond balancing checkbooks or processing words. Among my own interests are

## Marymae INDUSTRIES, INC.

In Texas Orders  
Questions & Answers  
1-713-392-0747

22511 Katy Freeway  
Katy (Houston) Texas 77450

To Order  
1-800-231-3680  
800-231-3681

### SAVE BIG DOLLARS ON ALL TRS-80<sup>®</sup> HARDWARE & SOFTWARE

TRS-80<sup>®</sup> BY RADIO SHACK. Brand new in cartons delivered. Save state sales tax. Texas residents add only 5% sales tax. Open Mon.-Fri. 9-6, Sat. 9-1. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

### WE OFFER ON REQUEST

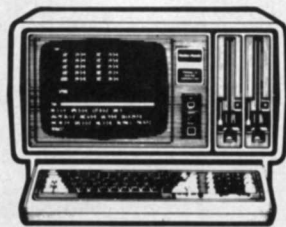
Federal Express (Overnight Delivery) ☒

Houston Intercontinental  
Airport Delivery (Same Day) ☒

U.P.S. BLUE (Every Day) ☒

References from people who have  
bought computers from us probably in  
your city. We have thousands of  
satisfied customers. WE WILL NOT BE  
UNDERSOLD!

ED McMANUS



No Tax on Out of Texas Shipments!

Save  
10% 15%  
OR MORE

Telex 77-4132 (Fleks Hou)

\* TRS-80 is a Registered Trademark of Tandy Corp

### WE ALWAYS OFFER

☒ We accept Master Card, Visa and American Express

☒ We use Direct Freight Lines. No long waits.

☒ We always pay the freight and insurance

☒ Toll free order number

☒ Our capability to go to the giant TRS-80<sup>®</sup> Computer warehouse 5 hours away, in Ft. Worth, Texas, to keep you in stock.

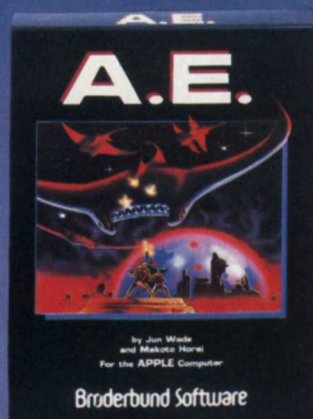
JOE McMANUS



# Broderbund Presents An Arcade Adventure

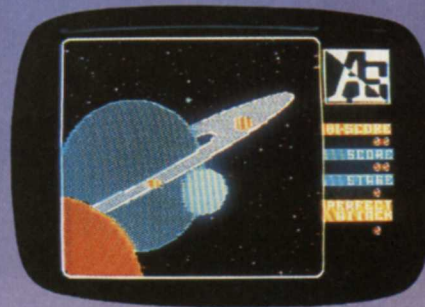


# A.E.



A.E.'s, produced by an industrial giant to control pollution on Earth have slipped quality control. They attack relentlessly in waves from the sky. Your mission: to drive them farther and farther into space. With each successful defense, you are transported to another, then another more distant 3-D environment. With these progressively difficult scenes, A.E. delivers the ultimate challenge.

Never has a computer game required such precision, such timing. You'll be hooked from the very start. A.E. (it means sting ray in Japanese) provides such enduring satisfaction on every level that it will become your personal standard of excellence in computer gaming.



Now available for Apple II,  
II+, IIe and Atari 400/800†

†Apple and Atari are registered trademarks of  
Apple Computer, Inc., and Atari, Inc. respectively.

## Broderbund Software

Broderbund Software, Inc. 1938 Fourth Street San Rafael, CA 94901 (415) 456-6424

CIRCLE 115 ON READER SERVICE CARD

**YOUR PROGRAM HERE**





# The best software for the IBM Personal Computer. Could it be yours?

Attention, all programmers. Here's a chance to reach the top.

If you've written software that's completed and runs on the IBM Personal Computer, we could be interested in publishing it.

(We also could be interested if it runs on *another* computer. If we select your software, we'll ask you to adapt it to our system.)

But be advised.

Our expectations are great.

Because the software we publish must be good enough to complement IBM Personal Computer hardware. In fact, the more you take advantage of all our hardware capabilities (see the box at right), the more interested in your software we become.

Think about incorporating color graphics into your program, for example.

Use sound. Consider the power of our keyboard and remember to utilize the ten programmable function keys.

In all cases, we're interested in "friendly" software—with emphasis on quality and wide appeal. Programs with the greatest chance of being published must be easy to use, offer a better way to accomplish a task and provide something special to the user.

What kinds of programs? All kinds.

Education. Entertainment. Personal finance. Data management. Self improvement. Games. Communications. And yes, business.

We select programs that will make the IBM Personal Computer an even more useful tool for modern times.

## IBM PERSONAL COMPUTER SPECIFICATIONS

<b>User Memory</b> 64K-640K bytes	<b>Display Screens</b> Color or monochrome High-resolution 80 characters x 25 lines Upper and lower case	<b>Permanent Memory</b> (ROM) 40K bytes
<b>Microprocessor</b> 16-bit, 8088	<b>Operating Systems</b> DOS, UCSD p-System, CP/M-86†	<b>Color/Graphics</b> <i>Text mode:</i> 16 colors 256 characters and symbols in ROM
<b>Auxiliary Memory</b> 2 optional internal diskette drives, 5¼" 160KB/180KB or 320KB/360KB per diskette	<b>Languages</b> BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL	<i>Graphics mode:</i> 4-color resolution: 320h x 200v Black & white resolution: 640h x 200v Simultaneous graphics & text capability
<b>Keyboard</b> 83 keys, 6 ft. cord attaches to system unit 10 function keys 10-key numeric pad	<b>Printer</b> All-points-addressable graphics capability Bidirectional 80 characters/second 18 character styles 9 x 9 character matrix	<b>Communications</b> RS-232-C interface SDL/C, Asynchronous, Bisynchronous protocols Up to 9600 bits per second
<b>Diagnostics</b> Power-on self testing Parity checking		

So, if you think your software is the best, consider submitting it. If it's accepted, we'll take care of the publishing, the marketing and the distribution. All you have to do is reap the benefits of our new royalty terms. And you're free to market your program elsewhere *at any time* even if you license it to us.

We're offering the ladder. Think about taking the first step.

For information on how to submit your program, write: IBM Personal Computer, External Submissions, Dept. 765 PC, Armonk, New York 10504.




## The IBM Personal Computer A tool for modern times

For more information on where to buy the IBM Personal Computer, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.  
†UCSD p-System is a trademark of the Regents of the University of California. CP/M-86 is a trademark of Digital Research, Inc.

CIRCLE 150 ON READER SERVICE CARD

# FRANKLIN'S BAKER'S DOZEN!



## 13 Good Reasons to Buy the **ACE1200**

1. **Apple® II-compatible**
2. **CP/M®-compatible**
3. **128K of RAM**
4. **Built-in floppy disk drive**
5. **Disk controller**
6. **80 column card**
7. **Serial interface**
8. **Parallel interface**
9. **Upper and lower case**
10. **VisiCalc® keys**
11. **Cursor control pad**
12. **Numeric pad**
13. **Auto repeat keys**

Extras can more than double the price of your personal computer. Not so with the Franklin ACE 1200. It's the professional computer system that includes the extras—and a long list of exclusive Franklin features that make it the most extraordinary value on the market today.

The ACE 1200 has everything you'll need to add a color or black and white monitor, modem, printer, back-up disk drive and other accessories. You can choose from the enormous selection of Apple programs and peripherals because the ACE 1200 is hardware- and software-compatible with

the Apple II. And, with the built-in CP/M card, you can run both Apple II and CP/M programs. Franklin's CP/M operates three times as fast as many competing systems, drastically reducing processing time for most business applications.

The Franklin ACE 1200—the most extraordinary value on the market today. Call or write today for the name of your local authorized Franklin dealer.

Franklin ACE is a trademark of Franklin Computer Corporation. Apple is a registered trademark of Apple Computer Inc. CP/M is a registered trademark of Digital Research Inc. VisiCalc is a registered trademark of Visi Corp.



**FRANKLIN**  
COMPUTER CORPORATION

2138 Route 38, Cherry Hill, NJ 08002 609-482-5900 Telex: 837-385

CIRCLE 168 ON READER SERVICE CARD

computer graphics and sound, and their use in education.

Okay. You might now have a better idea of what a microcomputer should be. I've gassed you up, and you're ready to "get behind the wheel." Next question: where to?

Let's do exactly what I cautioned against above, namely, summarily survey some geography; in order to carve a foothold we shall take a guided tour of some major software destinations in an effort to underscore three promising directions. The inclusions and omissions of course reflect my own biases, and what follows should not be construed as definitive in any way. What I wish to provide is a group of starting points. As more and more "right-brained" types invade the field, the scope and quality of this software will continue to soar. I enjoy imagining that some of the minds that will take part in the process are reading this now.

### Enriching Education

Remember Rubik's Cube? I spent a dozen hours or so learning to solve it, as have a few million other people around the world. Mathematicians were simply tickled pink with the physical embodiment of mathematical set theory the cube presented. In fact, Professor Rubik originally designed the cube as a tool to teach the concept to his own students.

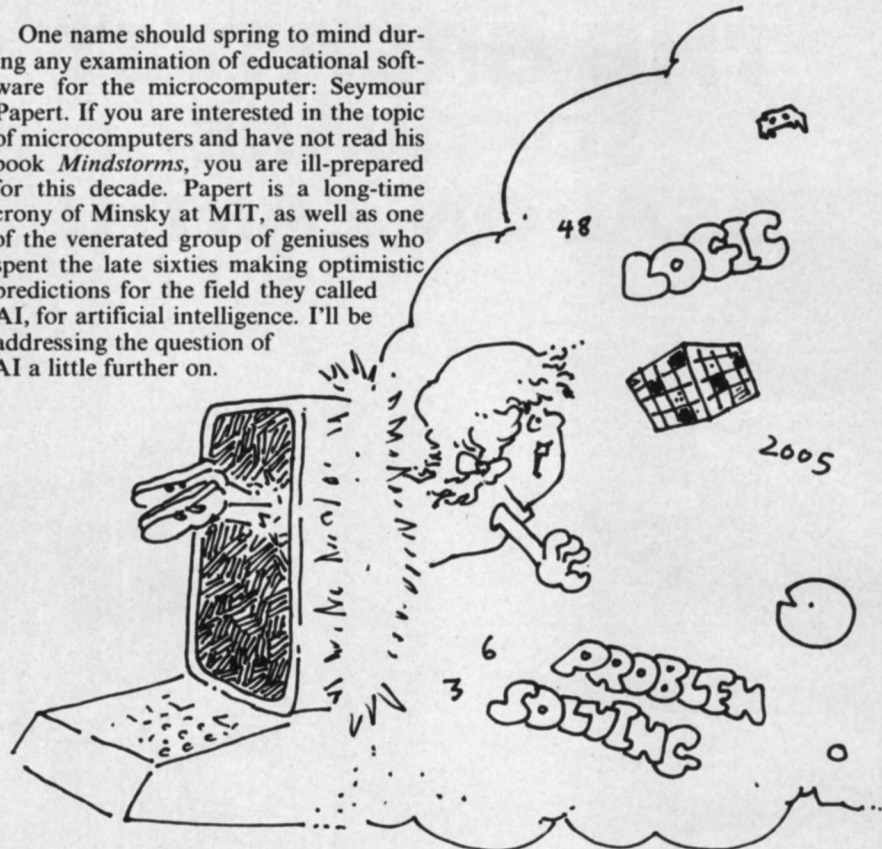
The thing that excites math teachers about the cube is the way it can impart an intrinsic sense of how it works to its users. What is to be stressed is that no kind of learning is more effective than

### **Things didn't turn out quite as dramatically as the MIT boys predicted in 1969.**

"hands-on" experience: in learning to solve the cube, the user gets a "feeling" for set theory.

Now imagine the graphic potential of the microcomputer to embody mathematical concepts. Several microcomputer programs, for instance, simulate a Rubik's Cube, with one slight improvement—the user can see all the faces of the cube simultaneously. This provides a more complete idea of what is happening as the faces spin. The microcomputer is unparalleled at providing this kind of tutorial power. Software developers who tap this potential are making the best use of the micro as an educational tool.

One name should spring to mind during any examination of educational software for the microcomputer: Seymour Papert. If you are interested in the topic of microcomputers and have not read his book *Mindstorms*, you are ill-prepared for this decade. Papert is a long-time crony of Minsky at MIT, as well as one of the venerated group of geniuses who spent the late sixties making optimistic predictions for the field they called AI, for artificial intelligence. I'll be addressing the question of AI a little further on.



Things didn't turn out quite as dramatically as the MIT boys predicted in 1969, nor on the predicted timetable. However in the interim, Papert took a language of his inner circle, Lisp, which is a powerful structure of lists built upon lists, and whipped it into Logo, a language that is now revolutionizing the elementary school classroom.

For years now, some educators have had the extremely unfortunate notion that computers are tools for only drill and practice—and so developed a field they called CAI, for computer-assisted instruction. Papert refers to this as the computer programming the learner. A computer is tirelessly terrific at administering drill and practice, and I believe there is a place for drill and practice in learning. But care should be taken that drill and practice never becomes the only purposes for which microcomputers are touched by students. The misuse of CAI has surely in some cases exacerbated latent cyberphobia.

A much preferable situation, states Papert, is one in which the student tells the computer what to do. That is a goal of Logo—to provide a language whereby the user "teaches" the computer how to complete a certain task. Turtle graphics, as an example, use this approach to help young children develop an intrinsic sense of geometry. The user does a great deal of learning in the process, of course. Learning about solving big problems by

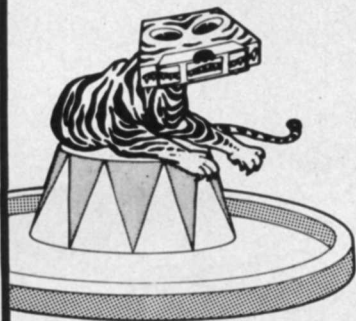
breaking them into groups of smaller problems; learning about logical thinking; learning to express solutions; learning that computers are tools to be manipulated by the user, not vice versa. These are indispensable lessons.

How soon should these types of interactions be introduced to the student? Some evidence indicates that kindergarten may well be too late, but I would confidently state that a first grade class will benefit greatly from access to a machine that runs Logo or another language with simple but pretty graphics and sound capabilities. Motivation of children will quite often be unnecessary—a teacher needs simply to work with them at their pace to achieve the results the children desire. Piaget would have been proud.

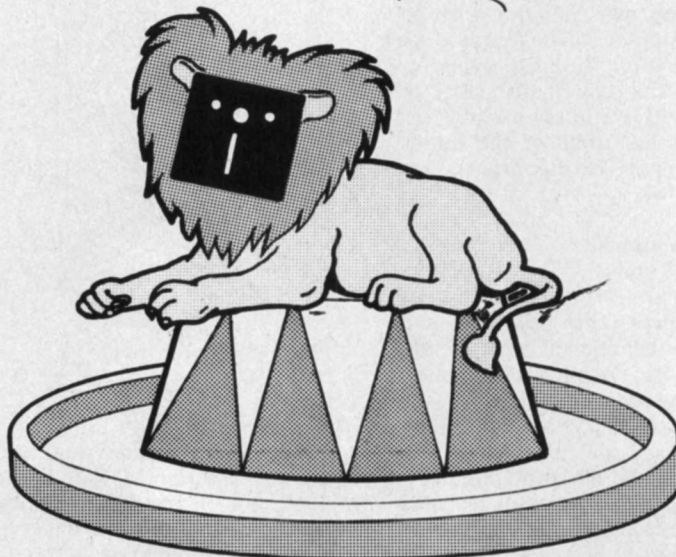
Another important group of educational programs (though they are often not viewed as such) are simulations. Rubik's Cube programs are simulations of an actual cube. In other simulations, the user sits in the cockpit of a 747 or on the throne of a medieval city-state; at the helm of a supertanker, perhaps, or even at the controls of a nuclear reactor. In situations otherwise dangerous, costly, or impossible to recreate, the computer can simulate the major factors that obtain, giving the students valuable first-person experience. I have been heartened by the joy of a group of fourth graders who have just avoided a meltdown. An

# THE GREATEST SOFTWARE DEAL ON EARTH!

**Radio Shack  
Color Computer  
TDP  
System 100**



Tame your computer without  
breaking your wallet's spirit!  
Quality programs on tape or disk  
for the price of peanuts!



A subscription to **Chromasette Magazine** consists of 6 to 8 ready-to-load useful, practical, and fun programs delivered by First Class Mail every month. Programs like Curve Fit, Diggem, Graph Text, List Mod, Robot Run, House Adventure, and Keep Text.

Treat yourself to a great show — get a subscription to **Chromasette Magazine**. Or catch a single act and try a back issue. You'll be delighted by the tricks your computer will do!

## The Bottom Line:

	<b>Tape</b>	<b>Disk</b>	Calif. residents add 6% to single copies.
1 year (12 issues)	\$50.00	\$95.00	North America — First Class postage included.
6 months (6 issues)	\$30.00	\$55.00	Overseas — add \$10 to subscriptions and \$1 to single copies. Sent AO rate.
Single Copies	\$ 6.00	\$11.00	

## The Fine Print:

All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.



# Chromasette

**MAGAZINE**

P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066 MasterCard/Visa  
CIRCLE 288 ON READER SERVICE CARD

**If you have a Radio Shack TRS-80 Model I or III there is Cload Magazine  
with programs on tape or disk especially tailored for your system.**

P.O. Box 1448, Santa Barbara, CA 93102 (805) 962-6271

**CLOAD  
MAGAZINE  
INC.**

CIRCLE 130 ON READER SERVICE CARD

## Cyberphobia, continued...

experience of this kind does much more for a child than merely hearing or reading about it. It becomes a self-motivated, reinforced, and above all, *exciting* learning experience.

### Enriching Entertainment

There is much controversy today concerning the dangers of the video game. Even the Surgeon General of our nation has expressed serious concern (while admitting a lack of hard evidence) that the games are "hazardous to your health." While some seek legislation to stop their proliferation, others seek to harness the power of the video game to constructive ends.

Some of the dangers associated with arcades (such as the availability of drugs and pilfering of quarters) can be right-

---

## **The video world is not a show. It is an interaction.**

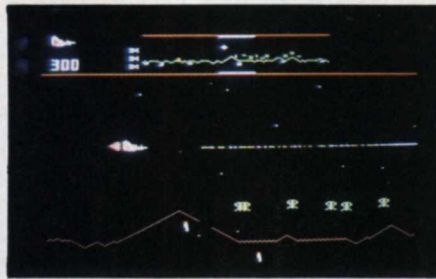
---

fully ascribed not to the games themselves, but to the environment in which they appear. I think that some regulation of arcades is a prudent course. The *best* place to play video games is obviously within the home. The atmosphere is healthier there; games do not require coins, and supervision can be much more effective.

I do not think the right kinds of games are harmful in the short or long run. As a member of the first TV generation, that sat passively in front of the set, I find it refreshing to see kids who take it for granted that video screens are a two-way street. At the least, the video world is not a show. It is an interaction. The key is moderation: obsession with anything is not a good idea.

Unfortunately, a very few home video games on the market today have attempted to base sales on sexism, murder, rape, arson, and other crimes (as humorously kinky, I suspect their hype would assert). Parents must now add video play to their vigilance concerning what their kids watch, read, eat, and so on. It is only to be expected in the final score of our fast-moving century.

Likewise, I don't believe that space "shoot-'em-ups" or games such as Pac-Man are harmful. Though they may at times seem to induce frustration or violent urges, they serve much more frequently to release those feelings—something of which passive video is incapable. I reject arguments that condemn the games on the basis of eventual and inevitable loss. Those arguments are



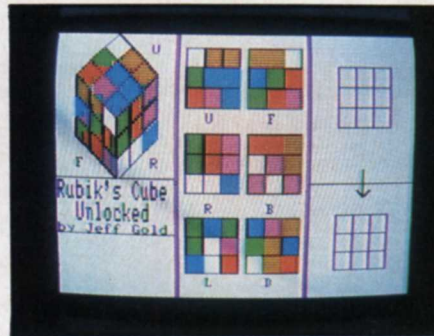
*Even the Surgeon-General of the United States has expressed concerns about the effects of video games on our children. Do "shoot-'em-ups" foster violence?*

raised by folks who have no idea why anybody plays the games at all.

The video game poses a world—a much simpler world than our own, wherein success is very clearly defined, and for a time, clearly attainable. Through practice, a player can control this world for a while. He can escape from the anxieties of real life into a place where his own actions always count, where he can be a hero. When the game is over, he hasn't lost or been beaten. Is a surfer beaten when he flies from a wave?

Most video games call for some semblance of hand-eye coordination, and some hospitals are now using them in rehabilitation programs for brain-damaged patients. It has been found that some patients who were otherwise thought to be unreachable have been "brought out" through their use. Moreover, experimental research is now being conducted regarding the feasibility of video games as a test for drunken driving. Intoxicants act to slow reaction time and impair coordination—and nowhere is this kind of impairment more measurable than on the video game playfield. Some day a poor showing at "Six-Pack Man" may cost you your license.

Video games for the microcomputer are not restricted to mere "twitch" games, however. Strategy games are at least as popular, and among these are the so-called "fantasy role-playing"



*A simulation of Rubik's cube allows the user to see all faces of the cube simultaneously. It may also step through a solution at the user's pace.*

adventures. These games allow the player to construct a whole new personality, choosing strengths and weaknesses from a list of possible character traits.

One might choose, for instance, a character who is extremely dextrous and swift, but these positive traits must be traded off against others, such as strength and endurance. Players have a tendency to become extremely attached to their characters. My preference runs toward brawn as opposed to brain, which probably reflects some compromise between reality and my own desires. I'm also attached to extrasensory powers, which are likewise denied to me in the real world.

After characters are created, they enter and interact within entire fantasy worlds: worlds wherein they can exercise a kind of free will, choose their fates, even experience their own deaths. These fantasy games are being used experimentally now with autistic and severely withdrawn adolescents. Though results are preliminary, they seem quite pos-

---

## **Interaction in an environment where even death isn't fatal can have real therapeutic value.**

---

itive. To the threatened personality, interaction in an environment where even death isn't fatal can have real therapeutic value.

Even the group we typically dismiss as "normal" can derive release through adventure games. I have predicted they will become, before long, as popular a fictional form as the novel or film. A portentous prediction, but one which I assert is utterly credible.

### Enriching Democracy

As I hope we begin to see, the microcomputer can do quite a great deal on its own, sitting on a desktop, coffee table, or TV cart. But hook it up to the phone lines, and you have established a new medium of expression: the telecommunications network.

Telecommunications through a home computer present a great deal of potential. The growing possibilities of travel reservations, ticket purchases, shop at home services, a broad range of databases at your fingertips, are worthy and practical. They herald a truly useful place for the microcomputer in the home.

# Sale! Limited Time Offer! Up to 60% Off Radio Shack Educational Courseware



High Motivation  
Reading Series

TRS-80 MicroPILOT™

## Inspire Your Students to Read with These Motivational Programs for the TRS-80® Computer

Radio Shack's High Motivation Reading Series (HMRS) is a great supplement in developing reading skills for levels 4-6. The series combines the use of stimulating illustrated texts, read-along cassette tapes and easy-to-operate programs that measure reading skills using the TRS-80 computer. Students are tested on understanding the main idea, the sequence of events, story details, and separating fact

and opinion. The Model III versions also include spelling and vocabulary exercises. You can use HMRS with our optional Student Records System to maintain a complete record of student scores for later review. HMRS requires our TRS-80 MicroPILOT authoring system (which can be used to create or adapt your own courseware materials).

### HMRS Programs for 32K TRS-80 Model I Disk Computers with Lowercase

# Cut 60%

Stretch your  
budget dollars  
on quality  
courseware

### HMRS Programs for 32K TRS-80 Model III Disk Computers

# Cut 40%

Receive total  
support in  
meeting your  
specific needs

Description	Cat. No.	Reg.	SALE
HMRS Charles Lindbergh/Amelia Earhart	26-2500	64.95	<b>25.98</b>
HMRS Hound of the Baskervilles	26-2501	59.95	<b>23.98</b>
HMRS Dracula	26-2502	59.95	<b>23.98</b>
HMRS Moby Dick	26-2503	59.95	<b>23.98</b>
HMRS The Beatles	26-2504	59.95	<b>23.98</b>
HMRS 20,000 Leagues Under the Sea	26-2505	59.95	<b>23.98</b>
HMRS Student Records System	26-2508	24.95	<b>9.98</b>
TRS-80 MicroPILOT	26-2205	99.95	<b>39.98</b>

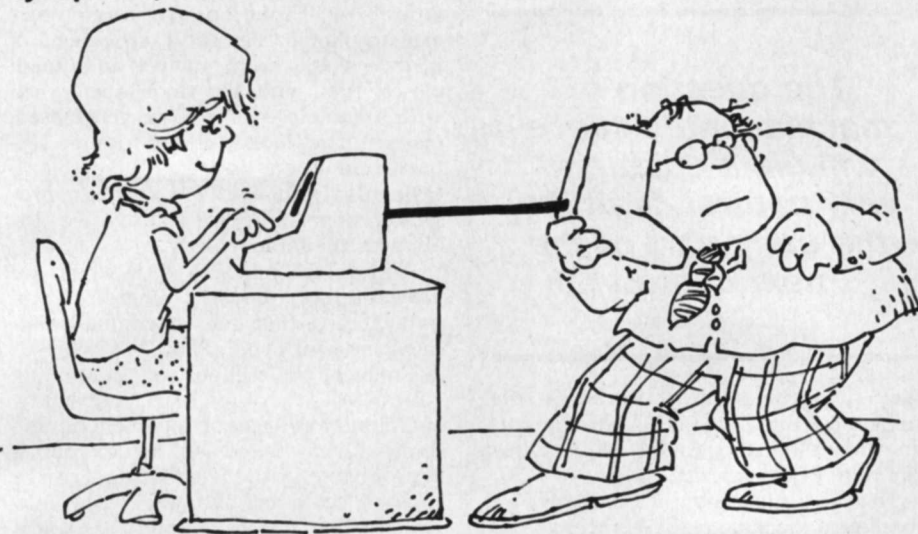
Description	Cat. No.	Reg.	SALE
HMRS Charles Lindbergh/Amelia Earhart	26-2513	74.95	<b>44.97</b>
HMRS Hound of the Baskervilles	26-2514	69.95	<b>41.97</b>
HMRS Dracula	26-2515	69.95	<b>41.97</b>
HMRS Moby Dick	26-2516	69.95	<b>41.97</b>
HMRS The Beatles	26-2517	69.95	<b>41.97</b>
HMRS 20,000 Leagues Under the Sea	26-2518	69.95	<b>41.97</b>
HMRS Student Records System	26-2521	29.95	<b>17.97</b>
TRS-80 MicroPILOT	26-2718	119.95	<b>71.97</b>

**Radio Shack®**  
The Name in Classroom Computing  
A DIVISION OF TANDY CORPORATION

Retail prices may vary at individual stores and dealers.

For the name of your Regional Educational Coordinator, call 800-433-5682, toll free. In Texas, call 800-772-8538.

CIRCLE 251 ON READER SERVICE CARD



I do not believe, however, that any of these practical notions constitutes the real basis for the mushrooming popularity of modem communications. Rather, the reason many people have discovered is the possibility of establishing a dialogue. They are less interested in using a modem to pay their gas and phone bills than to state their opinions, to have their voices heard, and to respond to the voices of others.

Networks and bulletin board services are blossoming nationwide and worldwide. These are phone lines tied to computers, big or small, running programs that accept and display information sent from other computers. The concept is powerful and limitlessly extensible. It creates a new kind of forum—a medium of communication—through which ideas can be expressed, shot down, modified, and spread. The importance of this kind of interaction, and its potential, is now being discovered. It will be some time before it emerges as a medium of major influence, but it is going to happen; it is happening now.

Why should my computer communicate with your computer, you may ask, when we could just as easily converse by voice? I assert that if we were strangers, it would not be nearly so easy. Modem communication transmits information purely—untainted by ego, personality, idiolect, affect, or mannerism. The ideas only are transmitted. It is, therefore, truly an equal opportunity medium.

Further, through the use of unlocked electronic mail, I may with my data establish a sort of long term party line—I may pose questions to be answered by many over a period of months. I may respond to queries put forth six weeks ago and discussed by dozens of others before me. I may even enter into a “real-time” conversation

---

***For the lonely, the  
bedridden, the  
handicapped, the  
advent of the  
telecommunications  
network will be  
an important  
psychological boost.***

---

with someone a thousand miles distant at 3:00 a.m. without feeling that my privacy is in any way compromised.

For the lonely, the bedridden, the handicapped, the advent of the telecommunications network will be an important psychological boost. Special interest boards have already made an appearance, the emphasis of which is on a single topic, such as science fiction or philosophy. This trend toward specialization is bound to continue.

**Still Wary, Huh?**

I'm aware that none of what I have stated so far will help you make better sense of the more esoteric components of *Creative Computing*. What I have tried to do, by way of demystification, coaxing, and a bit of hard sell, is instill in you the will to plow through the learning process—to help you understand why and how it would be worthwhile to tame your cyberphobic tendencies. And still, you are not convinced. Implicitly, I have been asking you all along to trust the power of computers: perhaps that is something you are still far from ready to do.

Well I can relate to that.

It could be that you have fallen into the same hole as many other folks: you wonder if the machines will beat us at our own game; you are hung up on the question of whether computers can think. You are in some impeccable company, believe me. Many smart people have spent many anxious hours worrying about this very concept. Their assumptions differ antithetically, but they are united in that they never get very far in their reasoning.

One problem that crops up immediately concerns the definition of the word “intelligence.” A person's definition of the term will certainly dictate, in large part, his views on the subject. We have a hard enough time agreeing on criteria by which to measure natural intelligence, let alone any synthetic varieties.

The definition of *artificial* intelligence I have heard most often is something like “that which would be ascribed to intelligence if it were done by a human.” This approach, of course, can get us into heaps of trouble. The chess-playing computer, for example, has forced a wide-ranging reappraisal of just what does and does not imply “intelligence” in a given context.

As is often my style, I will now casually sidestep the question to approach it from a different angle. Don't panic.

**Software Celebrities**

In 1966, Joseph Weizenbaum, another AI mogul from MIT, demonstrated a program he called Eliza. This program acted as a rudimentary psychiatrist, incorporating simple grammatical rules to hold limited “conversations” with its users. Though Weizenbaum has gone to great lengths to debunk the notion that anything about Eliza was in any way intelligent (he has written a very readable book, *Computer Power and Human Reason*, which makes the point), some people actually claimed to have benefited from Eliza's brand of non-directive therapy. This horrified Weizenbaum, whose strong humanist feelings helped temper the AI bluster coming out of MIT in the early 70's. To him the idea of Rogerian sessions conducted by an unthinking computer was ludicrous.

He missed an important point, however. In a sense, the fact that Eliza employed “tricks” in order to converse, turning user's statements around and shooting them right back, was less important than what some found to be the *quality* of “her” conversation. Eliza-like programs are now available for microcomputers, and though their capabilities remain quite limited, technology is providing new and inexpensive means for the simulation of human qualities undreamed of in 1966.

Computers with increasing powers of

speech, and more important, powers to listen to commands, are decreasing in price. I fully expect "personality programs" to make an appearance within the next two years. They will speak, accept voice commands, undoubtedly be endowed with the ability to answer the telephone, asking whether the caller wants a voice or data connection. They will in addition provide entertaining, though limited, conversation. Talk about a user-friendly operating system!

Additional pioneers in intelligence simulation are already coming to us from the field of robotics. The first *true* robot stars, real life R2-D2s and C3-POs, of which, rest assured, there will be an unending lineage, have begun to appear. (One of them, Hero-1, will be reviewed here soon.) Whether these machines are truly "intelligent" or "conscious" will be much less important than the fact that they are fun to use and interact with.

### Thinking About Thinking

I believe, as did the estimable mathematician Alan Turing, that the question of machine intelligence will die a quiet and very natural death by the early part of the next century. It will be resolved not by some sage, or by any sort of scientific proof, but as a practicality of language. Humanity will soon speak of machines thinking without a flinch. And yet, they will realize that machines will never think—at least not in exactly the way that human beings do.

Allow me to put forward another and much used metaphor. I attribute it to Donald Michie, though I have heard it in many forms.

When humanity first learned how to fly, the study of aerodynamics was coupled with, and in large part stemmed from, the study of the flight of birds. From the time of da Vinci, human attempts at flight often mimicked the real and supposed mechanics of bird physiology. These attempts were linked by a single thread—failure. No one today would argue that airplanes fly in exactly the same way as do birds. And yet both do fly.

We could, if we so desired, introduce the term *artificial flight* to describe the flight of the airplane. But there seems no need for this. The airplane does not mimic the bird; both call upon the rules of aerodynamics to leave the ground. We know these rules apply to both, that the study of these rules has enhanced our knowledge of animal flight, while the study of animal flight has advanced the cause of mechanized flight.

When thinking machines were first discussed, the term *artificial intelligence* was introduced. It may take humanity a while to realize that the term is super-

---

## **The question of machine intelligence will die a quiet and very natural death by the early part of the next century.**

---

fluous. Machines do not think in the same sense that humans do, nor computers mimic human thinkers. Both follow the rules of cybernetics.

Here is a suggestion: if the idea of an intelligent machine really bothers you to the point of distraction, try using the term "syntelligence" to describe these growing capabilities. That way our friend the computer can garner some of the credit it deserves, and at the same time that nasty word "artificial" has been eliminated. Feel a little better? C'mon now. Even the tiniest bit?

### Thanks for Nothing

Well, where are we left? Cyberphobes of the world, I don't know how much better off you are for this little excursion. It is as if I have sat you down and explained every reason why you shouldn't be afraid of confined spaces,

somehow expecting to cure your claustrophobia. The best approach, of course, would be to put you in a small closet: first with the door open, then with it half closed, three quarters closed, closed for a second, closed for two seconds, and so on, until you were able to extinguish your fear. I would also provide an opportunity for you to meet others with the same malady.

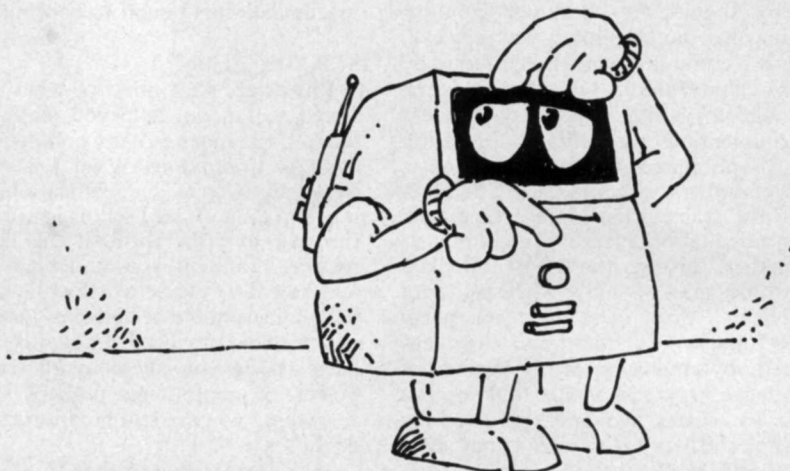
And so the question with which we are left is the following: Where can you go to receive that kind of gradual treatment for your cyberphobia?

Contact the school of continuing education at your local university, community college, or high school, and find out what "hands-on" micro courses are available. Although educators can be slow to catch on, many have by now realized that microcomputers are something worth teaching people about, and that a sizable part of this process is helping them overcome cyberphobic trepidation.

Visit your local computer store, and ask if they offer seminars. If they don't, ask why not. Then, after you have determined your needs, get yourself a microcomputer, and sit down at the keyboard. You'll be cruising in no time.

### The Punchline

And by all means, keep wading through *Creative*: you'll catch a little more each time. I nearly understand it now myself! □



TIMEX Sinclair 1000

The magazine for Sinclair and Timex Sinclair users

# SYNC

Math and Science:  
• Least Squares Analysis

Programming:  
• Alternative Display  
• Storing Words

Space Warp  
Graphics Game



# FOR SINCLAIR AND TIMEX SINCLAIR OWNERS ONLY

If you own a Timex Sinclair, a ZX81, or any other Sinclair computer, you've probably discovered that the big microcomputer magazines cover only the bigger computers. Where can you find helpful articles on the Sinclair? In *Sync*!

*Sync* is the one magazine that's written exclusively about Clive Sinclair's marvelous inventions, the Sinclair computers. And it's the one magazine to read if you want to get more from your Sinclair.

You'll find program listings for games, helpful programming techniques, hardware upgrades, math and science programs, news of new products for the Sinclair—in short, everything you need to use and enjoy your Sinclair to the fullest.

In just two recent issues, for example, we covered:

- ☐ Putting a Reverse Character in a String
- ☐ How to Double Your Memory
- ☐ Least Squares Data Analysis With the ZX80/81
- ☐ Space Warp: A Graphics Space Game
- ☐ How to Reduce "Blank Screen Time"

- ☐ Storing Three-Letter Words in an Array
- ☐ Software Review: ZX Galaxians
- ☐ An Introduction to Expression Evaluation
- ☐ Short Programs Just for Fun
- ☐ The ZX81 Parser and User-Defined Commands
- ☐ Understanding Floating Point Arithmetic
- ☐ Handling Strings from Another Dimension
- ☐ Book Review: Understanding Your ZX81 ROM
- ☐ How to Add a Keyboard to Your Sinclair
- ☐ Translating Other Basics: DEF on the ZX81
- ☐ Six Outer Space Games—With Program Listings
- ☐ Hardware Review: Sinclair ZX Spectrum High Resolution Color/Sound Computer

If you own a Sinclair microcomputer, *Sync* is the only computer magazine you really need. Subscribe now to *Sync*, and you can save up to 33%! Just complete and return the postage-paid reply card or the coupon at right.

**SAVE UP TO 33%  
ON SYNC!**

**SYNC**

CN 1986 • Morristown, NJ 07960

**YES!** Please send me *Sync* for:

- ☐ One year (6 issues) for \$12.97—I save 19%.
- ☐ Two years (12 issues) for \$22.97—I save 28%.
- ☐ Three years (18 issues) for \$31.97—I save 33%.

Savings based on full 1-year subscription price of \$16.

Mr. \_\_\_\_\_  
Mrs. \_\_\_\_\_  
Ms. \_\_\_\_\_  
(please print full name) 8H13  
Address \_\_\_\_\_ Apt. \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

**CHECK ONE:**

☐ Payment enclosed. ☐ Bill me later.

Offer valid in U.S. and possessions only. Please allow 60 to 90 days for delivery of first issue.

**NEW SUBSCRIBERS ONLY**

# Lyc0 Computer Marketing & Consultants

TO ORDER  
CALL US

TOLL FREE 800-233-8760  
In PA 1-717-327-1824

## PERCOM DRIVE

SINGLE DRIVE AT88 .....	\$379.00
ADD ON .....	\$289.00
SINGLE DRIVE 40S1 .....	\$479.00
ADD ON .....	\$329.00
DUAL DRIVE 40S2 .....	\$845.00
DUAL HEAD SINGLE DRIVE 44S1 ...	\$649.00
DUAL HEAD DUAL DRIVE 44S2 ....	\$989.00

### HARD DISK DRIVES for

APPLE	IBM-PC	TRS-80*
5 MEGABYTE DRIVE .....		\$1099.75
10 MEGABYTE DRIVE .....		\$1399.75
15 MEGABYTE DRIVE .....		\$1799.75
20 MEGABYTE DRIVE .....		\$2275.75

\*Add \$30.00 for TRS-80 Drives

### JOYSTICKS

POINT MASTER .....

\$12.75

### WICO

APPLE - VIC - ATARI - TI

COMMAND CONTROL .....

\$20.75

RED BALL .....

\$22.75

TRACK BALL .....

\$51.75

EXTENSION CORD .....

\$9.75

APPLE ADAPTOR .....

\$18.95

T.I. ADAPTOR .....

\$9.95

### PRINTER RIBBONS

PROWRITER .....

\$9.95

NEC .....

2/\$19.75

SMITH CORONA ...

\$8.50

EPSON .....

\$10.95

### SANYO

MBC 100 (with micropro) ...

\$1549.00

MBC 1250 COMPUTER .....

\$2195.00

MBC 4050 COMPUTER .....

\$2749.00

EFD 100 ADD-ON DISK .....

\$499.00

5500 LETTER QUALITY

PRINTERS .....

\$649.00

### INTERFACING AVAILABLE FOR

APPLE

VIC 20

ATARI

VIC 64

EPSON

NEC

PROWRITER

SMITH-CORONA

APPLE DUMPLING GX .....

\$99.75

APPLE DUMPLING 64... (16 Buffer)...

\$179.75

### BLANK DISKETTES

ELEPHANT .....

\$18.25

MAXELL MDI .....

\$32.75

MAXELL MDII .....

\$42.75

DISK CASE .....

(holds 10) \$4.95

DISK CASE .....

(holds 50) \$19.75

ROM CASE .....

(holds 10) \$19.75

KANGROO .....

\$17.75

BULK DISKS (qty 150) .....

\$1.50 ea.

CALL for PRICES on  
RANA DISK DRIVES  
MICROMAINFRAME DRIVES

### commodore

VIC 20 .....

\$CALL

VIC 64 .....

\$CALL

1542 DISK DRIVE .....

\$339.75

1525 PRINTER .....

\$339.75

1530 DATASETTE .....

\$69.75

1110 8K RAM .....

\$53.75

1211 SUPER EXPANDER .....

\$53.75

1212 PROGRAMMERS AID .....

\$44.75

1213 VICMON .....

\$44.75

VIC 20 DUST COVER .....

\$6.99

VIC 64 DUST COVER .....

\$6.99

CASSETTE INTERFACE .....

\$29.75

6 SLOT EXPANSION .....

\$89.75

3 SLOT EXPANSION .....

\$29.75

### CARDCO

6 SLOT EXPANSION .....

\$79.95

3 SLOT EXPANSION .....

\$24.95

UNIVERSAL CASSETTE

INTERFACE .....

\$29.95

VIC 20/64 PRINTER

INTERFACE .....

\$59.95

CARDADAPTER/1

(ATARI VCS) .....

\$69.95

16K RAM .....

\$59.95

VIC 64/20 LIGHT PEN .....

\$29.95

### MONITORS

NEC JB1260 .....

\$125.00

NEC JB1201 .....

\$155.00

NEC TC1201 .....

\$315.00

AMDEK 300G .....

\$159.00

AMDEK COLOR I .....

\$289.00

### MODEMS

ANCHOR MARK I .....

\$79.00

ANCHOR MARK II .....

\$79.00

HAYES SMART .....

\$239.00

HAYES MICRO II .....

\$309.00

CAT .....

\$144.00

D-CAT .....

\$155.00

J-CAT .....

\$115.00

APPLE CAT II .....

\$279.00

212 APPLE CAT .....

\$589.00

## SAVE on these in-stock PRINTERS

GORILLA GX-100 .....	\$199.00
GEMINI 10 .....	\$319.00
PROWRITER I 8510 .....	\$369.00
NEC 8023 .....	\$399.00

OKIDATA 92 .....

\$SAVE

OKIDATA 82 .....

SAVE

OKIDATA 83 .....

LOWEST

OKIDATA 84P .....

PRICE

OKIDATA 93 .....

AVAILABLE

TRACTOR .....

SAVE

TRACTOR .....

\$49.75

PROWRITER 2P .....

\$699.00

GEMINI 15 .....

\$449.00

PRINTMASTER .....

\$1589.00

SMITH CORONA TP1 .....

\$549.00

CITON 8600B .....

\$1025.00

STARWRITER .....

\$1099.00

# Lyc Computer Marketing & Consultants

TO ORDER

CALL US

TOLL FREE

800-233-8760

In PA 1-717-327-1824

## 800 48K...\$459.00

with purchase of Programmer.....\$49.00

FREE CATALOG with over 60 manuf. for ATARI

## ATARI 810 . \$409.



A Warner Communications Company

### HARDWARE

810 DISK DRIVE...\$419.00  
410 RECORDER...\$75.00  
1010 RECORDER...\$75.00  
850 INTERFACE...\$164.00  
400 16K.....\$ CALL  
400 64K.....\$ CALL  
1200 64K.....\$CALL  
1025 PRINTER...\$419.75

### PACKAGES

CX482 EDUCATOR.....\$109.75  
CX 483 PROGRAMMER.....\$51.75  
CX488 COMMUNICATOR...\$219.00  
CX419 BOOKKEEPER.....\$164.75  
KX7104 ENTERTAINER.....\$63.75

### SOFTWARE

QIX.....\$31.75  
CXL4012 MISSILE COMMAND...\$25.75  
CXL4013 ASTEROID.....\$25.75  
CXL4020 CENTIPEDE.....\$29.75  
CXL4022 PACMAN.....\$29.75  
CXL4011 STAR RAIDER.....\$29.75  
CXL4004 BASKETBALL.....\$25.75  
CXL4006 SUPER BREAKOUT.....\$25.75  
CXL4006 SPACE INVADER.....\$25.75  
CX8130 CAVERNS OF MARS.....\$27.75  
CXL4007 MUSIC COMPOSER...\$33.75  
CXL4002 ATARI BASIC.....\$45.75  
CX8126 MICROSOFT.....\$65.75  
CXL4003 ASSEMBLER  
EDITOR.....\$45.75  
CX8126 MACRO ASSEMBLER...\$69.75  
CX415 HOME FILING  
MANAGER.....\$41.75  
GALAXIAN.....\$29.75  
DEFENDER.....\$29.75  
DIG DUG.....\$29.75  
SPEED READING.....\$53.75  
ATARI WRITER.....\$54.75  
BOOKKEEPER.....\$102.75  
CX4018 PILOT HOME.....\$54.75  
CX 405 PILOT EDUCATOR.....\$91.75  
CX404 WORD PROCESSING...\$99.75

### BUSINESS SOFTWARE

VISICALC.....\$159.75  
LETTER PERFECT.....\$115.75  
LETTER PERFECT (ROM).....\$149.75  
DATA PERFECT.....\$99.75  
TEXT WIZZARD.....\$79.75  
SEPL WIZZARD.....\$64.75  
FILE MANAGER 800+.....\$69.75  
HOME FILING MANAGER.....\$41.75  
BOOKKEEPER.....\$119.75  
C.R.I.S.....\$199.75  
ATARI WORD PRO.....\$109.75  
TAX ADVANTAGE.....\$35.75  
HOME ACCOUNTANT.....\$59.75

### NEW RELEASES

MINER 2049er...\$32.75  
ZAXXON.....\$29.75  
MONKEY WRENCH...\$52.75  
BANK STREET WRITER...\$49.75  
JUMPMAN.....\$26.75  
PHAROAH'S CURSE.....\$24.75  
FORT APOCALYPSE.....\$24.75  
ELIMINATOR.....\$18.75

JUMPMAN D.....\$26.95  
SHAMUS 2 C/D.....\$24.95  
PINHEAD C/D.....\$22.95

### BOOK of ATARI SOFTWARE 1983

346 pages \$16.75

### ENTERTAINMENT SOFTWARE

CRISIS MOUNTAIN.....\$25.95  
WARLOCKS REVENGE.....\$25.95  
CHOPLIFTER.....\$22.75  
TEMPLE OF ASPHI.....\$26.75  
STAR WARRIOR.....\$26.75  
INVASION ORION.....\$19.75  
KING ARTHUR'S HEIR.....\$22.75  
RESCUE AT RIGEL.....\$22.75  
PACIFIC COAST.....\$23.75  
CANYON CLIMBER.....\$23.75  
CLOWNS & BALLOONS.....\$23.75  
MICRO PAINTER.....\$23.75  
SANDS OF EGYPT.....\$23.75  
APPLE PANIC.....\$21.75  
SERPENTINE.....\$25.75  
STAR BLAZER.....\$24.75  
WIZARD & PRINCESS.....\$22.75  
FROGGER.....\$22.75  
CROSS FIRE.....\$32.75  
SAM SPEECH.....\$45.75  
VOICE BOX II.....\$125.75  
GORF (ROM).....\$29.75  
WIZARD OF WAR.....\$26.75  
PREPPIE 2.....\$19.75  
STRATOS.....\$23.75  
SEA DRAGON.....\$23.75  
POOL 1.5.....\$24.75  
POOL 400.....\$28.75  
SPEEDWAY BLAST.....\$28.75  
BAJA BUGGY.....\$23.75  
STARBOWL  
FOOTBALL.....\$28.75  
SUBMARINE COMMANDER...\$34.75  
JUMBO JET.....\$34.75  
KICKBACK.....\$34.75  
SOCCER.....\$34.75  
SHAMUS.....\$22.75  
SLIME.....\$22.75

16K ATARI RAM.....\$49.75  
32K RAM.....\$69.75  
48K RAM.....\$99.75  
64K RAM.....\$129.75  
128K RAM DISK....\$399.75  
INHOME KEYBOARD.....\$49.75  
TARA KEYBOARD.....\$99.75  
TECHNICAL NOTES...\$29.75

80 Column Screen Board.....\$279.75

### EDUCATIONAL SOFTWARE

STATES & CAPITALS.....\$12.75  
EUROPEAN COUNTRIES.....\$12.75  
FRENCH.....\$45.00  
GERMAN.....\$45.00  
SPANISH.....\$45.00  
ALIEN ENCOUNTER.....\$25.75  
GULP.....\$25.75  
FRENZY.....\$25.75  
BATTLING BUGS.....\$25.75  
COMPU-MATH.....\$23.75  
COMPU-READ.....\$23.75  
ADDITION.....\$14.95  
ANALOGIES.....\$14.95  
LET'S SPELL.....\$14.95  
MEMORY BUILDER.....\$14.95  
MINICROSSWORD.....\$14.95  
NUMBER SERIES.....\$14.95  
PRESCHOOL IQ BUILDER...\$14.95  
READING COMP.....\$14.95  
SAMMT the SEA SERPENT...\$14.95  
SPELLING BUILDER.....\$14.95  
STORY BUILDER.....\$14.95  
VOCABULARY ONE.....\$14.95  
VOCABULARY TWO.....\$14.95  
WORD SEARCH.....\$14.95  
PLAYER MISSILE.....\$24.75  
MATH for FUN.....\$13.95  
MUSIC LESSON.....\$24.95  
FIGURE FUN.....\$24.95



### POLICY

DEALER INQUIRIES INVITED



In-Stock items shipped within 24 hours of order. Personal checks require four weeks clearance before shipping. No deposit for COD orders. PA residents add sales tax. All products subject to availability and price change. Advertised prices show 4% discount offered for cash. Add 4% for Mastercard and Visa. FREE SHIPPING ON PREPAID CASH ORDERS

TO ORDER  
CALL TOLL FREE

800-233-8760

In PA 1-717-327-1824

or send order to

Lyc Computer

P.O. Box 5088

Jersey Shore, PA 17740

# Of Marriage In The Computer Age

---

## Michael Rossman

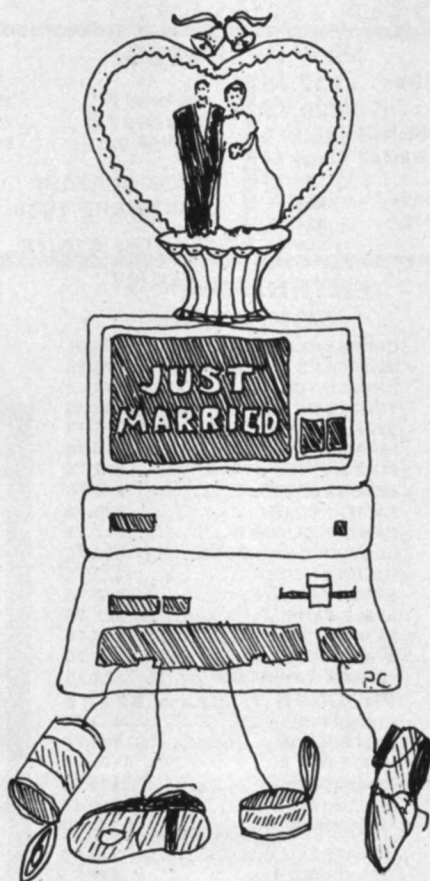
---

When Kevin got a computer to do his work at home, he put it in the bedroom where the phone was, to link it to the big office machine. When he worked late he could watch the moon through the bedroom window while Mary slept in the guest room. He had hoped to interest her in his new tool, and he succeeded because she wrote her thesis on the word processor. But tension brewed between them. Assuming that Mary didn't like sleeping in the guest room, Kevin shifted the phone and computer to the kitchen and gave up the moon.

It didn't help. Three months passed before a friend of Mary's took him aside and told him why Mary was snappish and had cooled to sex. After they made love, Kevin would get up and go back to work at the console. He thought he was doing her a favor by coming to bed briefly when she retired. He had never understood that lying together afterward, talking and drifting into sleep, mattered as much to her as making love.

Talking it over at last, they agreed that he would wake her when he was finally ready for bed. This worked better for a while, though sleepy love wasn't Mary's first choice. Fortunately, a promotion soon gave Kevin his own computer at the office, cutting out his homework—and leaving him to lie abed early, alone in the moonlight, while Mary labored at the word processor till the wee hours.

Michael Rossman, 1741 Virginia St., Berkeley, CA 94703.



As the computer revolution invades ordinary life, couples find themselves tangled in domestic conflicts involving the machine and its effects. Sometimes the difficulties are superficial and readily resolved as with Kevin and Mary. The problems, however, may run deeper, having less to do with the computer than with the people and the relationship involved.

---

***She was jealous  
of the Apple  
as if it were  
another woman.***

---

Marriage counselors are encountering a minor wave of cybernetic cases with couples who can't straighten things out by themselves. "It's another spin-off of the computer industry, a subsidiary maintenance business," one therapist told me. "It's just starting, and I expect it will grow."

### The Other Woman

When Lisa found herself getting upset and angry each time Carl disappeared into the den, she realized she was jealous of the Apple as if it were another woman. She chided herself for reacting so strongly. After all, Carl was home and available though preoccupied. She was simply missing some time with him and wondered why she felt not only neglected, but resentful and incompetent.

They had shopped for their Apple together like many affluent couples buying a toy. Indeed, Lisa had pushed him to get it and had thought it would be great fun to play with it together. He would teach her to program as he learned; she would put her recipes on it, use it to manage the household budget, to help the kids out in school and attempt unpredictable marvels. She was in love with the idea, and the machine, too, at first, glossy with promises of power.

The computer, of course, was more complex and difficult to work with than she had imagined and far more stupid as a helpmate. It couldn't suggest what to have for dinner or cure their overspending. The children played video games, neglecting their homework. Nor did Lisa find herself moved to learn what she might about programming; though

# Electronic Communications Made simple for The Apple®:

## Transpaks™ From SSM.

SSM Transpaks give you all the modem hardware and Transend™ software you need to connect your Apple II/IIe® to the world of electronic communications.



### Public information services. Transend Software lets your Apple do the walking.

Transpak 1 connects your Apple to other Apples, to mainframe systems, or to public information networks. In fact, all Transpaks include valuable subscription offers to three time-saving information services: THE SOURCE™, Dow Jones News/Retrieval®, and DIALOG's Knowledge Index™.

THE SOURCE provides instant access to SourceMail business and UPI world news, stock reports, government activity, and private newsletters—even shopping at discount prices.

Dow Jones News/Retrieval keeps you current with the latest corporate news, stock prices, sports statistics, economic surveys, and exclusive news and information from *The Wall Street Journal*, *Baron's*, and *The Dow Jones News Service*.

The Knowledge Index instantly locates articles, reports or books from an electronic library of over 10,000 journals. You can request information on practically any topic, and in seconds the Knowledge Index will direct you to pertinent articles.

SSM Transpaks will help you do more:

### Electronic mail. Transend software gets it there in seconds.

Transpak 2 insures that information you exchange with other Apples will arrive intact. You can send and receive important documents or files of any size over any distance with complete confidence.

With Transpak 3 and a clock card, your unattended Apple can send electronic mail *automatically* to up to 100 other unattended Apples anywhere in the world, at any hour. You'll save time and phone costs by exchanging information at night when rates are lowest.

Each Transpak includes the SSM 300-baud Apple-Modem Card™ with convenient auto-dial/auto-answer capabilities. For the fastest communication available on the Apple, SSM's Transpak 2+ or Transpak 3+ features the SSM TransModem 1200—a 300/1200-baud stand-alone modem.



### Choose your Transpak and get started today.

Each Transpak includes all the communications software and hardware you need in one simple package. Your SSM dealer can help you select the Transpak that's right for you. SSM guarantees your satisfaction or your money back.

	Software	Hardware
Transpak 1	Transend 1 Terminal Emulator	300-baud Modem Card
Transpak 2	Transend 2 Electronic File Transfer	300-baud Modem Card
Transpak 3	Transend 3 Unattended Electronic Mail	300-baud Modem Card
Transpak 2+	Transend 2	TransModem 1200 with serial interface and cable
Transpak 3+	Transend 3	TransModem 1200 with serial interface and cable

Apple and Apple II/IIe are registered trademarks of Apple Computer Corporation. Transend, Transpak, AppleModem and TransModem 1200 are trademarks of SSM Microcomputer Products, Inc. THE SOURCE is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc. Knowledge Index is a service mark of DIALOG Information Services.



### Transend it.

SSM Microcomputer Products Inc.  
2190 Paragon Drive, San Jose, CA 95131  
408/946-7400

## Marriage, continued...

she was bright, she found this discipline quite alien.

What upset her so in Carl's dalliance with the Apple was not simple neglect, but a jealousy deepened by her own disappointment, the failure of her own passion for the machine—which festered and stung her as Carl mastered it. Though their relationship was basically sound, it was snarled in conflict by the time this came out in therapy.

After Lisa recognized the effects of her own disappointment, they found a simple solution. Carl vowed to spend more time with her and with the children. They bought a sailboat, refurbished it together and grew adept at sailing as a team. Well before they got it afloat Carl's infatuation with the Apple had cooled. Though he still disappeared into the den occasionally to play with it, the computer had become just another toy, no longer a threat to their relationship.

"Many couples pass through a phase like theirs with some discomfort but no real difficulty," observes Dr. Arvalea Nelson, a Berkeley marital therapist. "But it's trickier when the computer isn't just a



and the problem undiscussed. He felt increasingly anxious and overwhelmed, and went through crises of depression. Neither of them questioning her opinion that the problem was his alone, Peg convinced him to go to a therapist.

Peg quickly felt betrayed. Instead of "fixing John up" so that he could go back to getting ahead in his job, the therapist encouraged him to take a leave of absence to explore the interests he had neglected in the past and to begin making his own decisions again. With their joint income cut, Peg couldn't buy the new disk drive she wanted. By the time John started training for a new community service career, he was much happier and more in possession of himself—and Peg felt so threatened by his changes that she finally agreed to see the therapist herself.

The therapist started slowly, helping her learn to write lists *with* John rather than *at* him. Soon Peg grasped that the problem had been as much hers as his. The therapist encouraged her to express her sense of humor and the other parts of herself that she had set aside when she left school. And she realized that the one-sided persona she had developed was no better for her than it was for John. Her spontaneous, adventurous spirit, which had attracted him and had found little exercise in management and programming, was not dead but dormant. She realized how narrow her interests had grown, and she enjoyed broadening them again as she worked to develop new balances in her relations with John and with her work.

As for John, when Peg stopped using her obsessive linear streak to run his life, he found himself comfortable with that

side of her again. Indeed, he depended on it when he turned to Peg for help in organizing his own work in a service agency and then in setting up a computerized business system for the whole agency.

Their story illustrates the complex ways in which computer involvement affects marriages and marriage partners. Tensions are worse when one partner becomes totally involved and the other has no connection. This happens frequently, and sometimes the outcome is less fortunate.

### Hastening The Inevitable

At 28, Buzz took to computing like a duck to water, and soon broadened his company work to jet-set consulting, leaving his wife, Cathy, far behind. The more he got into it, the more she found him simply not there for her. He was withdrawn and inaccessible or speaking a language she felt she couldn't begin to comprehend. His new friends, all strangers to her, spoke it, too; he had no patience for their mutual friends.

Baffled and frustrated by his distance, Cathy decided that Buzz was boring, narrow and unexciting, and she told him so frequently. In retaliation he let her know more often that he found her dumb, and he grew more critical of whoever and whatever didn't relate to the new world he found exciting. Trapped in this dynamic of accusation and defensiveness, their marriage deteriorated rapidly. Counseling merely helped them separate on tense but civil terms.

"But their marriage was doomed even without the computer," remarked their therapist. "Neither one had enough generosity of spirit to respect the other's interests and differences. Conflict over the computer probably saved them five years of slow discovery that they didn't really care for each other very much.

"In most successful marriages partners try to develop complementary roles for themselves in each other's worlds. Cathy could have enjoyed going on vacations with Buzz when he spoke at conferences.

### ***Their marriage was doomed without the computer.***

She might not have understood his technical presentations, but she could have shared his excitement and pride in them. Instead she stayed home, resentful. Of course she needed to develop her own world more, to be comfortable with such a fringe role in his. But Buzz shot her down as inept when she talked of starting her own business, and she bought his

### ***Carl's infatuation with the Apple had cooled.***

novel toy, when one partner enters into an organic and ongoing relation with it. Sometimes the problems affect the whole marital relationship, and the solutions can be quite far-reaching."

### Programming Your Partner

When John first moved in with Peg, he had no idea he would become a computer husband. As a drama student, Peg seemed so different from his mother, a librarian, who was domineering and compulsive about organization. But in truth Peg's character was enough like his mother's to make the relationship comfortable for John. It served Peg well when she turned to business management after graduation.

Business brought Peg to the computer, and her personality led her to enjoy it. As she learned more about programming, the obsessive-compulsive streak in her character grew stronger through constant exercise and began to affect their relationship. Peg started making lists for John—at first only of household tasks he should manage, but soon also of ways he should behave with her and things he should do to improve his performance at work.

She seemed to be trying to program him. It was so rational and benevolent, though, that John retreated into a passive aggression, leaving the lists uncompleted

**NEW  
UP TO 2MB  
ON  
A SINGLE  
CARD!**

# STATE OF THE ART MEMORY SYSTEMS

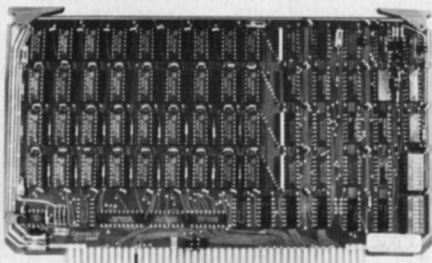


## 512KB SINGLE BOARD IBM MEMORY W/RS232-C PORT

- Addressable as a contiguous block in 64KB increments thru 1 megabyte.
- On board parity with interrupt on parity error.

**SINGLE QTY. PRICE: \$795.00**

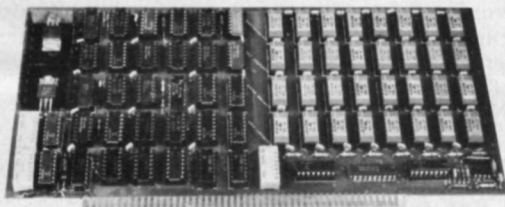
**MEMDISK 1** Allows memory to emulate disks. Increases system performance!!  
FREE with purchase of memory.



## 64KB SINGLE BOARD EXORCISER I, II, AND ROCKWELL SYSTEMS 65 MEMORY

- Parity checker on board.
- Addressable as a contiguous block in 4K increments with respect to VXA or VUA.
- Pin to Pin compatibility.

**SINGLE QTY. PRICE: \$250.00**

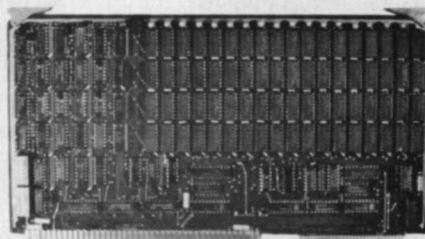


## 64KB SINGLE BOARD S100 MEMORY

- Addressable as a contiguous block in 4K word increments.
- Battery back-up capability.
- Functions with on-board refresh.

**SINGLE QTY. PRICE: \$250.00**

**NEW**



## 512MB TO 2MB SINGLE BOARD MULTIBUS MEMORY

- Pin to Pin MULTIBUS compatibility for both 8 bit and 16 bit systems.
- On board parity with selectable interrupt on parity ERROR.
- Addressable up to 16 megabytes.

**SINGLE QTY. PRICE:**

<b>512KB</b>	<b>\$ 895.00</b>
<b>1MB</b>	<b>\$4495.00</b>
<b>2MB</b>	<b>\$8700.00</b>

**NEW**



## 256KB TO 1 MB SINGLE BOARD LSI 11 MEMORY

- On board parity generator checker.
- Addressable as contiguous block in 256KB increments through 4 megabytes.
- Battery back-up mode.

**SINGLE QTY. PRICE:**

<b>256KB</b>	<b>\$ 595.00</b>
<b>512KB</b>	<b>\$2650.00</b>
<b>1MB</b>	<b>\$3995.00</b>

**DON'T ASK WHY WE CHARGE SO LITTLE, ASK WHY THEY CHARGE SO MUCH.**



# Chrislin Industries, Inc.

31352 Via Colinas • Westlake Village, CA 91362 • 213-991-2254  
TWX 910-494-1253 (CHRISLIN WKVG)

CIRCLE 136 ON READER SERVICE CARD

## Marriage, continued...

know-it-all judgment. If he had really wanted to meet her as an equal, he could have helped her in many ways. But he wanted her to fail and success to be his alone."

### A Unique Problem?

There is nothing novel or special about the impact of computers on marriages, because similar kinds of strain and conflict arise out of many expensive tools

## Computer involvement tends to be compellingly hypnotic.

and intense enthusiasm that lead partners on separate paths. Most therapists agree that involvement with computers rarely creates new problems in a relationship, but tends instead to evoke or deepen those that are already present. Still, some argue that it can do this with unusual and remarkable force.

"Computer involvement tends to be compellingly hypnotic, as addictive as a drug," notes therapist Marcia Perlstein. "It can be worse than another lover as a competing force for attention—totally involving, always available, and quite demanding. When your partner is not in front of the terminal, he is thinking about the problem he left behind; and when he is finally done he doesn't want to pay attention to anything, but just goes passive. Even for a mate who is not jealous and who appreciates his passion for the keyboard, it can be quite a strain.

"Anyone who finds himself getting deeply involved, to the point that his computer habit becomes hard to control, will do well to find a way to make it his primary work and then to leave his work at the office. Bringing it home will prob-

ably court strain in the relationship—and many people find it all too easy to retreat even more into the computer to avoid dealing with *that*."

### Sexism?

Since computers don't care which sex punches their keys, such stories of strife between women and men run both ways. In Eunice and Bob's case, Eunice was the one responsible, having a linear mind and a somewhat tight manner, which found programming a fertile ground. Bob was the free spirit and part-time actor who found unemployment romantic. He might have encouraged her spontaneity and growth, but he had put her in a box in his mind, and felt threatened each time she tried to step beyond it. By the time Eunice left him, she was well on the way to becoming a feminist. For work had been no better than home. Her women's group was the only place Eunice felt complete, a competent woman having trouble with a mate.

Still, it is primarily men who buy computers and program them, and women who stand by baffled as their mates disappear in abstract obsession. Some reports from schools suggest that a crop of 14-year-old girls excited about programming is coming along well. For adults, however, computer relations and marital problems are strongly biased along old, sexist lines. How much of this bias is due to biology and how much to social conditioning? No one knows yet, but it affects women and men quite differently.

"Women tend to have much deeper trouble in relating to computers than most men are prepared to understand," observes Perlstein. "Our conditioning leaves us alienated both from the computer hardware, and from the mathematical and symbolic languages that programming involves. This makes the challenge of involvement very threatening. Many women

feel so stupid and defensive in its face that they dodge the challenge completely.

"It's not so good for a relationship, to feel that the only way to keep in contact with your mate is to understand something foreign and difficult. One tends to resent the other person, from feeling forced. And there is often a great deal of resistance to being taught, when he seems to know it all, and you feel helpless. Reactions like this strain relationships, and also cut women off from what they might do and enjoy—for many women are much better able to deal with computers than they realize—or would be if they were properly supported."

As for men, computer involvement reinforces their own sex-role conditioning in quite a different way, perhaps worse for relationships. "Men tend to find it easier not only to relate to computer hardware and concepts," agrees Dr. Nelson, "but also to use these to escape from the problems of relationships. Men's tendencies to suppress emotional aware-

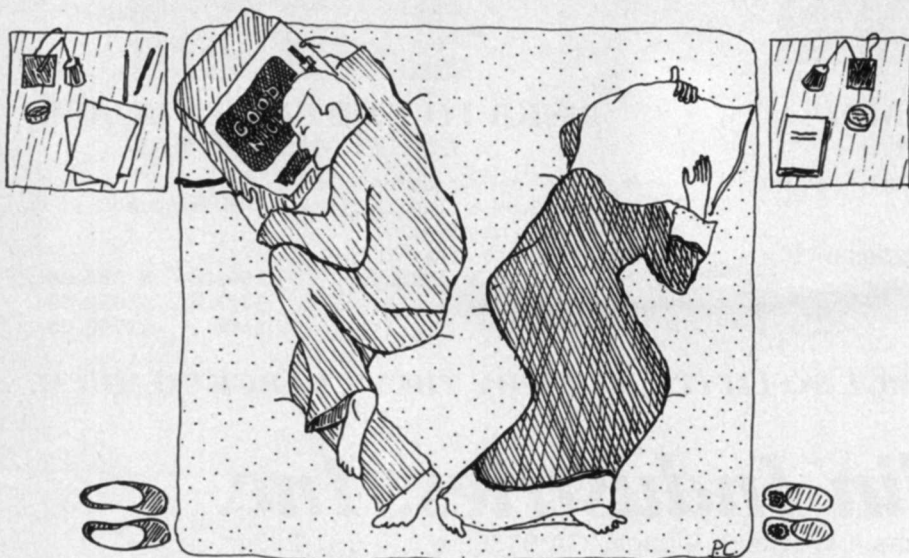
## Computer programmers tend to be a fairly neurotic bunch anyway.

ness and expression in favor of abstraction are often encouraged by serious computer activity. Men who handle conflict by withdrawing, as many do, are at special risk in their relationships if a computer is available at home. They should take special care to be deliberate and positive about making contact with their mates—not just when things are relaxed, but when there is strain between them."

### Problems For Professionals

The problems that computer involvement brings to marriages may be most visible and exaggerated among the people most deeply involved, the professional programmers. "Computer programmers tend to be a fairly neurotic bunch anyway, made more so by the character of the machines and tasks they work with," observes Dr. Michael Evans, a noted Berkeley psychologist. "What they do is extremely complex and abstract, and quite precarious. Large works can collapse on tiny mistakes, and do so repeatedly. One might think they would get used to 'bugs,' but many people never do, and find them hard to take in stride, a constant and depressing strain.

"Programmers tend to be introverted people, high achievers, prone to anxiety, and, of course, quite obsessive. It is hard to get them to take even a ten-minute



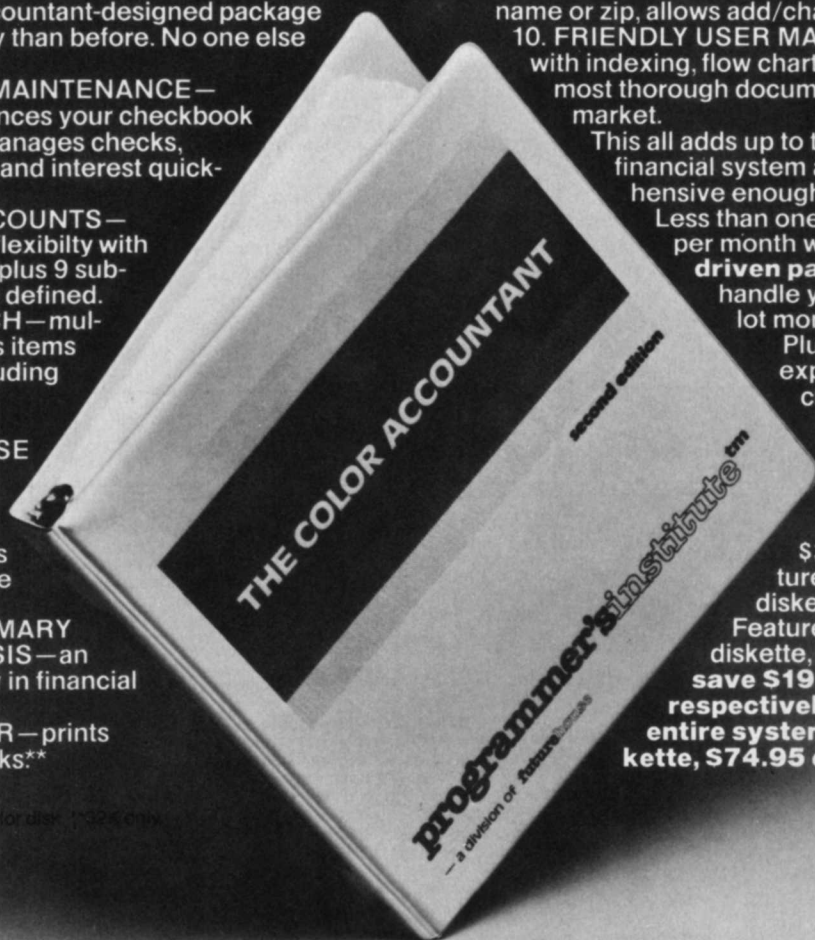
# Complete Personal Accountant: we've made the best much more friendly.

If you have any doubts that we offer the best and most complete personal financial package available, look over the features listed below. Now we have the only package with **full screen editing** for Atari 400/800\*, TRS-80 COLOR, Commodore 64\* and VIC-20; the ability to move the cursor in any direction makes our accountant-designed package even more friendly than before. No one else offers all of these:

1. CHECKBOOK MAINTENANCE — automatically balances your checkbook with each entry; manages checks, charges, deposits, and interest quickly and accurately.
2. CHART OF ACCOUNTS — maximum of user flexibility with up to 99 accounts plus 9 sub-categories may be defined.
3. CHECK SEARCH — multi-reference; tracks items on every field including tax deductibles.
4. NET WORTH/INCOME/EXPENSE STATEMENT — know exactly where you stand; program generates statements with the touch of a key.
5. DETAIL & SUMMARY BUDGET ANALYSIS — an absolute necessity in financial planning.
6. CHECK WRITER — prints personalized checks.\*\*

7. PAYMENTS/APPOINTMENTS CALENDAR — monthly displays of up to 250 bills and 200 appointments.
8. COLOR GRAPH DESIGN PACKAGE — graphs all monthly files.
9. MAILING LIST — maintains all records, sorts by name or zip, allows add/change/delete.
10. FRIENDLY USER MANUAL — complete with indexing, flow charts and diagrams; the most thorough documentation on the market.

This all adds up to the finest personal financial system available — comprehensive enough for a small business. Less than one hour of data input per month will allow this **menu-driven package** to help you handle your finances with a lot more fun than drudgery. Plus, ours is the only expandable system; purchase the package in sections and add on as your financial needs grow. Features 1, 2, 3 and 6: \$39.95 diskette, \$36.95 cassette; Features 4 and 5: \$29.95 diskette, \$26.95 cassette; Features 7, 8 and 9: \$29.95 diskette, \$26.95 cassette; or **save \$19.90 or \$15.90 respectively by buying the entire system for \$79.95 diskette, \$74.95 cassette.**



\*Random Access available for disk, \*\*32K only.

Prices subject to change without notice. See your local dealer or order direct. New catalog available. Add \$3.00 for postage and handling. Credit card orders call toll free:

## 1-800-334-SOFT

DEALER INQUIRIES INVITED

# programmer's institute

a division of **futurehouse**

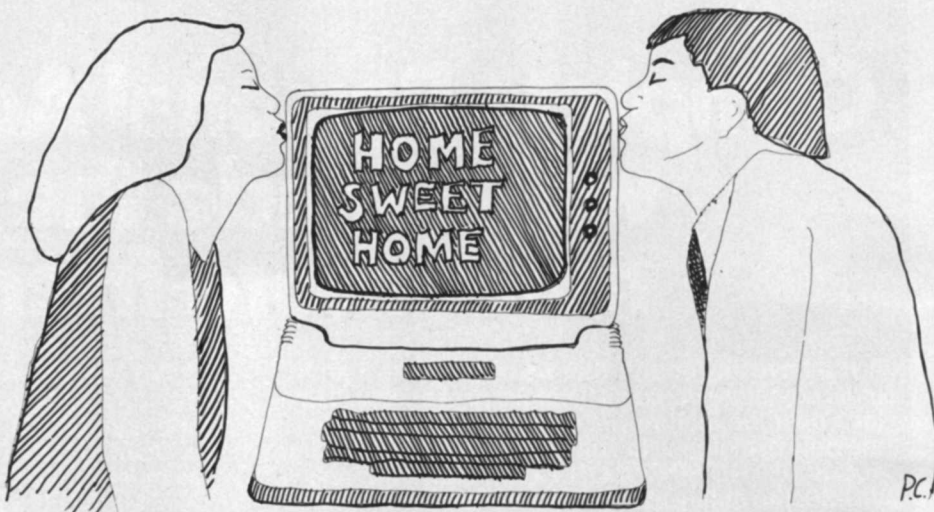
p.o. box 3470, dept. A, chapel hill, north carolina 27514, 919-967-0861

CIRCLE 169 ON READER SERVICE CARD

## Marriage, continued...

break. All this affects their abilities to begin and to maintain relationships. Their obsessiveness makes it difficult for them to accommodate others. Their jobs are not only stressful but stretchable and flexible, expanding to fill all available hours. Their language is so special that they can't talk about their work to their wives or girl friends. On the job they interact with peers around technical matters and don't really relate to each other; their bosses rarely realize the kinds of support and encouragement they need. All this is tough on relationships. It's no wonder so many programmers find it easier to relate almost exclusively to computers, than to people, and intimacy, so much more complex and demanding."

What Dr. Evans observes about professional programmers seems to apply no less poignantly to amateurs, to the many husbands and wives now being caught up in the growing, less specialized ranks of the computer-involved. A marriage in which the partners are equally eager and able to undertake the cybernetic adventure is indeed fortunate (though programmer couples are often better at solving programming problems than couple problems, which occur no less regularly among them than among common folk). Marriages without this rare equality tend to take the advent of the computer better if one partner is already

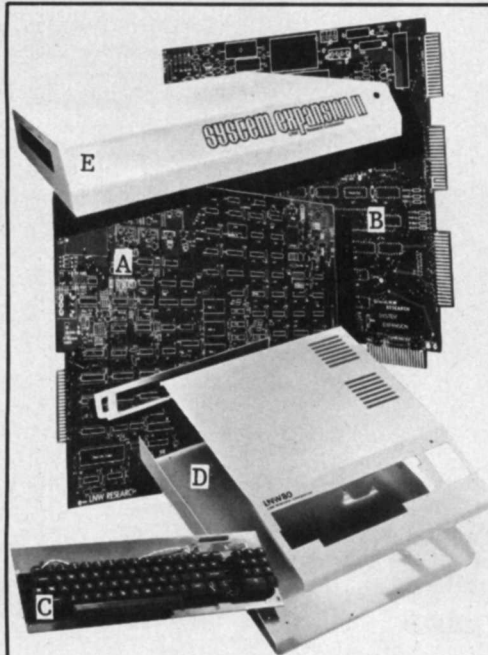


used to the other's tendency to go off in specialized obsession, and if some agreement about how to stay in contact is worked out. Without this, trouble comes with the software, like an un-indexed program.

It would be nice to wish away the problems that computers pose for marriages, or wish for some simple, dependable solutions. But the problems are real and massive, and often intractable, because they come with the medium—not only of marriage, but of cybernetics. Com-

puter use and programming are all of the above—complex, demanding, consuming of time and consciousness—and a strain. In their present stage of development, they are also directly and ineluctably depersonalizing. At the same time, they are thrilling, a deep human adventure, and, in the end, perhaps not a narrow one. The strains and obstacles their use creates in relationships are an unavoidable part of the human price we are paying for the power we are beginning to grasp through our cybernetic extension. □

## COMPUTER KITS – FROM \$69.95



**LNW SEMI-KITS** can save you hundreds of dollars. By obtaining your own parts at the lowest possible cost and assembling the **LNW SEMI-KITS**, you can have the most highly acclaimed microcomputer in the industry—the **LNW80**. The **LNW SEMI-KITS** are affordable modules. You can start with a modest cassette system and expand to a full 4Mhz TRS-80 compatible system with 5 or 8 inch double density disks and color at any time.

**A. LNW80 CPU**—Made of high quality FR4 glass epoxy double sided circuit material, with plated-through holes and gold edge connector. It is fully solder-masked and silk screened. Here are just some of the outstanding features you will have when your **LNW80 CPU** board is fully assembled: • 16K RAM • Color and black and white video • 480 x 192 high resolution graphics • 64 and 80 column video • 4 Mhz Z80A CPU • Upper and lower case display • 500 and 1000 baud cassette I/O —\$89.95

**B. SYSTEM EXPANSION**—Expand the **LNW80** computer board, **TRS-80** and **PMC-80** computer with the following features: • 32K memory • Serial RS232C and 20Ma port • Real time clock • Parallel printer port • 5 inch single density disk controller • Expansion bus (screen printer port) • Onboard power supply • Solder-masked and silk screened legend —\$69.95 (tin plated contacts) —\$84.95 (gold plated contacts)

**C. KEYBOARD**—74 key expanded professional keyboard—includes 12 key numeric keypad. Fully assembled and tested. —\$99.95

**D. COMPUTER CASE**—This stylish instrument-quality solid steel case and hardware kit gives your **LNW80** that professional factory-built appearance. —\$84.95 Add \$12.00 for shipping.

**E. SYSTEM EXPANSION CASE**—This stylish instrument-quality solid steel case and hardware kit gives your **SYSTEM EXPANSION** interface that professional factory-built appearance. —\$59.95 Add \$10.00 for shipping.

**F. LNW80 CPU – HARD TO FIND PARTS KIT – \$82.00**

**G. LNW80 VIDEO – HARD TO FIND PARTS KIT – \$31.00**

**H. SYSTEM EXPANSION – HARD TO FIND PARTS KIT – \$27.50**

**I. LEVEL II ROM set. (6 chip set) – \$120.00**

**VISA and MasterCard** accepted. Add \$3.00 for shipping plus \$1.00 for each additional item. All shipments via UPS surface. Add \$2.00 for U.S. Mail. Shipments outside continental U.S.: funds must be U.S. dollars. Sufficient shipping costs must be included with payment.

**ORDERS & INFORMATION – (714) 544-5744**  
**SERVICE – (714) 641-8850**

# LNW Research Corp.

2620 WALNUT Tustin, CA. 92680

CIRCLE 202 ON READER SERVICE CARD

# HARMONY VIDEO & COMPUTERS

## 800-221-8927

### COMMODORE

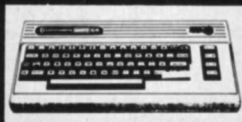
VIC 20	89.95
COMMODORE 64	369.95
VIC 2N DATASETTE	59.95
COMMODORE DISC DRIVE	289.95
1525P PRINTER	289.95
COMMODORE MONITOR	249.95
VIC TELEPHONE MODEM	89.95
RS 232 TERMINAL INTERFACE	CALL
IGEE-488 INTERFACE	CALL
VIC 8K MEMORY PAC	39.95
VIC 16K MEMORY PAC	89.95
MOTHER BOARD	89.95
VIC 3K SUPER EXPANDER	
VIC PROGRAMMER'S AID	CALL
VIC MON	CALL
INTRO TO BASIC I & II	69.95

### APPLE 2 PLUS

999.95

### APPLE 2E

CALL



### EPSON MX 80 PRINTER

399.95

### EPSON FX 80 PRINTER

599.95

### ATARI

ATARI 400 W16K	159.95
ATARI 800 W48K	449.95
ATARI 1200 XL W64K	589.95
ATARI 410 RECORDER	76.95
ATARI 1010 RECORDER	77.95
ATARI 810 DISC DRIVE	389.95
ATARI 830 ACOUSTIC TEL. MODEM	159.95
ATARI 850 INTERFACE	169.95
ATARI 822 THERMOL PRINTER	CALL
ATARI 1020 40 COL. PRINTER	219.95
ATARI 1025 80 COL. PRINTER	379.95
ATARI 16K MEMORY EXPANDER	89.95
ATARI WORD PROCESSOR	69.95
ATARI BASIC REF. GUIDE	CALL
ATARI PROGRAMMER KIT	CALL
ATARI ENTERTAINER KIT	29.95

WE CARRY A FULL LINE OF SOFTWARE FOR  
ATARI AND COMMODORE  
CALL FOR LOWEST PRICES

ALL  
SONY  
T.V.'s IN  
STOCK  
CALL  
FOR  
LOWEST



ALL  
VCR's  
IN  
STOCK  
CALL  
FOR  
LOWEST

P  
R  
I  
C  
E  
S

VIDEO TAPE (By case of 10 only)						
VHS	VHS	HIGH	BETA	BETA	BETA	
T120	T160	GRADE	L500	L750	L830	
TDK	8.85	14.75	10.75	6.50	7.99	10.25
FUJI	9.65	14.75	11.75	6.50	7.99	
MAXELL	8.40	13.50	10.25	6.50	7.99	10.25
MEMOREX	8.75	13.50	10.50	6.50	7.99	10.25
SCOTCH	8.50	13.50	10.25	6.50	7.99	
SONY			10.25	6.99	8.40	10.25
JVC	9.50	13.50	11.50			
RCA	8.90					
PANASONIC	8.50					
TDK PROFESSIONAL T120						15.95
MAXELL PROFESSIONAL L750 OR T120						15.95
MEMOREX PROFESSIONAL						16.95

P  
R  
I  
C  
E  
S

FOR THE LOWEST PRICES ON VIDEO CALL 800-221-8927

To order simply dial toll free 800-221-8927 with your Master Card or VISA and your order will arrive via UPS or send certified check or money order only to: HARMONY VIDEO AND ELECTRONICS, 2357 Coney Island Ave., Brooklyn, N.Y. 11223, and add approximate shipping postage and insurance charges. Credit cards for phone order only. For customer service please dial (212) 627-8960. All prices and availability subject to change without notice. All orders shipped out of state. Dealer inquiries invited!!! For sales info dial (212) 627-6989. Open Sun. 10-4 Mon.-Thur. 9-7 Fri. 9-3.

## 800-221-8927

COMMODORE ATARI APPLE TEXAS INSTRUMENTS EPSON

CIRCLE 149 ON READER SERVICE CARD

JVC • PANASONIC • SONY PROFEEL • ZENITH • HITACHI • QUASAR

G.E. • SANYO • SONY PROJECTION • TDK • MAXELL • FUJI • SCOTCH • SONY • RCA

# SIX GREAT BOOKS FOR COMPUTER ENTHUSIASTS!

## PROGRAMMER'S GUIDE TO CP/M®

edited by Sol Libes

This authoritative volume of reprints from *Microsystems* magazine is a must for the programmer writing software for CP/M or the individual installing CP/M on non-configured systems. *Programmer's Guide to CP/M* includes sections on: CP/M structure and format • The CP/M connection • Interfacing CP/M to operating systems. File operations. CP/M on North Star systems • CP/M software reviews • CP/M enhancements • CP/M directories • CP/M applications programs • CP/M assemblers • Evaluations of MODCOM, COMMX, MCALL, OSI and other software • Business and accounting programs • Compiler BASIC • Data base systems • Debuggers/Disassembler • Editors, formatters and word processors • Encryption. The *Guide* also offers material on interpreters, languages, utilities, sort programs and much more. CP/M is the most widely used, most commonly implemented operating system in the world. This book provides a focused look at its unique and practical features.

8½" x 11", softcover, \$12.95 (\$2.00). #14C.

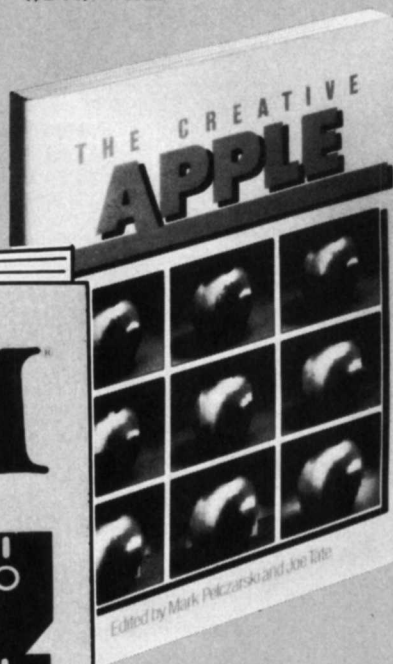


## THE CREATIVE APPLE®

edited by Mark Pelczarski and Joe Tate

Here's a superb collection of articles and features on the Apple taken from the past four years of *Creative Computing*. Recently revised and updated, this wealth of material provides you with dozens of ways to tap the tremendous potential of your Apple, with information-packed chapters on graphics music, education, word processing, business applications, Appletalk, software reviews, ready-to-run programs, branches and programming tips. Whether you use your Apple for business, teaching, home budgeting or just having fun, you'll find plenty of ways here to get more out of it than you ever dreamed!

8½" x 11", softcover, illustrated, \$15.95 (\$2.00). #18R.

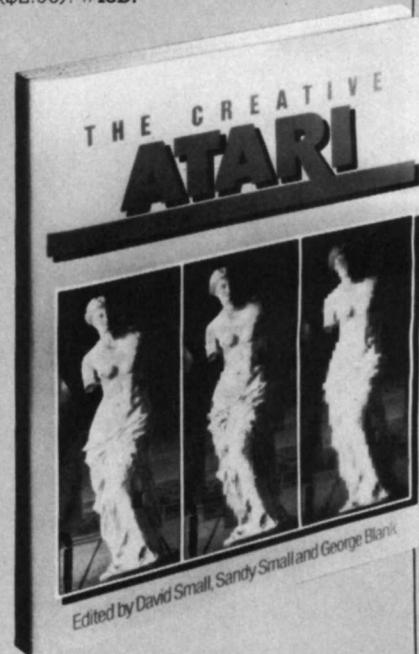


## THE CREATIVE ATARI®

edited by David Small, Sandy Small and George Blank

This volume is an invaluable guide for the average, non-expert user who knows a little about BASIC and simple programming. The Atari is one of the most sophisticated consumer graphics devices ever invented. Yet because it is so powerful, learning how to use its special features can be difficult for all but the most skilled programmers. Here's where this book can help. Taking articles, columns and tutorials that previously appeared in *Creative Computing*, the authors have updated the material for maximum learning ease. In *The Creative Atari* you'll find a discussion of Atari memory concepts essential to programming, a tutorial on Atari graphics, a collection of programming tips, information on non-graphic applications, programs you can type in yourself, reviews of commercial programs available, and much more. You'll also find an Appendix with a reference guide to useful Atari information. No Atari owner should be without this volume!

8½" x 11", softcover, illustrated, \$15.95 (\$2.00). #18B.



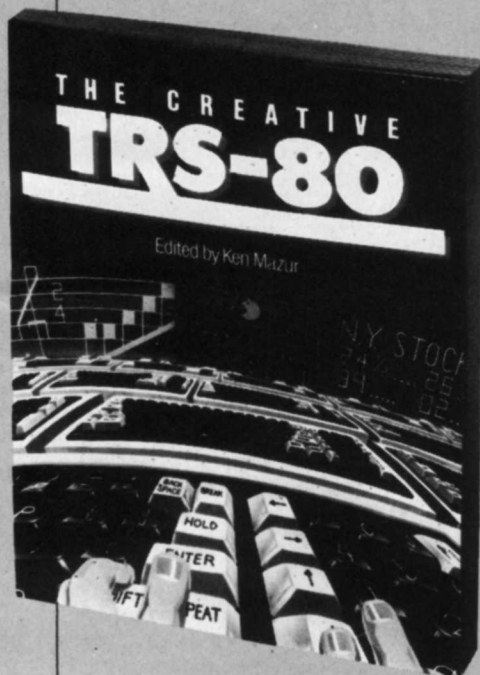
# Informative, stimulating and challenging "how to" volumes from Creative Computing Press.

## THE CREATIVE TRS-80®

edited by Ken Mazur

A complete guide covering everything from games to business applications for the TRS-80, all taken from past issues of *Creative Computing* and thoroughly updated. The chapter on games gives you nine full-length listings you can type directly into your computer. Expense management, record keeping and other applications are discussed in the chapter on personal productivity. Other chapters offer extensive material on education, business applications, investment management, word processing, graphics, programming tips, software, hardware and peripherals. Your TRS-80 is a wonderful tool for learning, having fun, and improving the quality of your life. With *The Creative TRS-80*, you'll expand the uses of your machine—and its value to you—in a hundred new and exciting ways!

8½" x 11", softcover, illustrated, \$15.95 (\$2.00) #18Y.



Registered Trademarks: Apple: Apple Computer, Inc.  
Atari: Atari, Inc. CP/M: Digital Research, Inc. TRS-80:  
Radio Shack Div. of Tandy Corp.

## COMPUTERS FOR SEA AND SKY

by Stephen J. Rogowski

*Computers for Sea and Sky* is an outstanding new reference book for aviators and navigators. It substitutes computer programs for many currently used charts and tables. The author, a noted computer lecturer and an FAA certified ground instructor, has developed a series of programs in BASIC (accurate to six decimal places) that cover areas such as DME speed correction, rate of climb, crosswind computation, latitude/longitude dimensions, barometric correction, navigation by VOR, distance by vertical angle, and many more. For fliers and sailors, and anyone involved in the fields of aviation, navigation, mathematics, speed/distance computation, charting and meteorology, *Computers for Sea and Sky* will be an invaluable tool and a source of information.

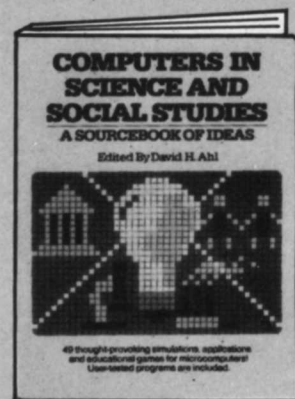
8½" x 11", softcover, \$9.95 (\$2.00) #14F.



## COMPUTERS IN SCIENCE AND SOCIAL STUDIES

edited by David Ahl

This brand-new book for high school students brings together over forty articles on the sciences and computers from *Creative Computing*. Topics include Social Studies, Psychology, Chemistry, Biology, Health, Physics, Geography, Economics, History, Medical Simulations, Ecology, Population Studies, Astronomy, Interstellar Trade, Nuclear Power Plant Simulations, Computer Simulations in the Classroom and much more! Games, program listings and brief tutorials are included to expose the student to scientific use of the computer...and many different programming techniques! 8½" x 11", softcover, \$14.95 (\$2.00). #9X.



For Faster Service  
PHONE TOLL FREE:

**800-631-8112**

(In NJ only:  
201-540-0445)

Also available at your local bookstore or computer store.

### CREATIVE COMPUTING PRESS

Dept. HA6T, 39 East Hanover Avenue, Morris Plains, NJ 07950

Please send books listed below:

Book No.	Qty.	Title	Price Each	(P&H) Each	Total Price
Postage and handling charges appear in parentheses ( ) next to price of book			TOTAL AMOUNT		

CA, NJ and NY State residents add applicable sales tax

☐ PAYMENT ENCLOSED \$\_\_\_\_\_ Outside USA add \$3.00 per order.

☐ CHARGE MY: (Charge and phone orders \$10 minimum.)

☐ American Express ☐ MasterCard ☐ Visa

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Mr./Mrs./Ms. \_\_\_\_\_ (please print full name)

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City/State/Zip \_\_\_\_\_

☐ Send me a FREE *Creative Computing* Catalog.

# Handicapped and Working

**Kirby L. Morgan**

Perhaps I am not so unusual. After all, in this emerging age of personal computers, many people are starting to work from their homes. In one respect, however, I am different from most of these other "homeworkers"; I have no other choice. You see, I am handicapped.

I have had rheumatoid arthritis since the age of eight—almost thirty years now. As it does for many people, my arthritis started out as a small ache and stiffness in my joints but as the years went by, my condition slowly worsened.

In high school, I started using crutches. By my senior year in college, I had to use a wheelchair and was confined to my home. That year I had to do all of my coursework by correspondence—no easy feat, since I live in Michigan and the college was in Florida. Nevertheless, I graduated with highest honors.

For my graduate studies, I chose a school closer to home, Michigan State University. Still, I had to do all of the work at home. My perseverance paid off, however, and I obtained my master's degree in physics in 1972.

By that time, I was completely bedridden, unable to move any of my joints except for my right hand and arm. So while other physics graduates were moving on to their careers, my job prospects appeared dim. Apparently, none of the companies I contacted could even conceive of a physicist working independently at home.

## First Job

Finally, unable to find regular employment, I started working part-time for Michigan State developing physics instructional materials. This was



how I first became involved with microcomputers.

The project that I was working for was starting to use microcomputers to edit the text for self-paced physics lessons. If I could get a micro, the project director said, it would help me a great deal in my work and also enhance my job prospects.

Armed with that information, I contacted the Michigan Bureau of Rehabilitation in the fall of 1978, to see if they could help me purchase a microcomputer. Despite their reluctance to make such a large expenditure, the computer was eventually purchased for me, about a year later.

Finally, in February of 1980, the computer was delivered to my home. It consisted of a keyboard, a video monitor, two 8" double density disk drives, and special high-resolution videographics boards. I also got a 300 baud modem so I could communicate with other computers over the phone.

The software that I received included

CP/M 1.4, Microsoft Basic and Fortran. Also included was special software to display scientific text.

Although I had had over a year to read about operating and programming a microcomputer, it was not until I actually got my hands on one that I really started to understand the intricacies of programming.

## Special Setup

Being unable to use the computer physically was the first obstacle to be overcome. Since I can't move by myself, I have to be on a special bed that can be rotated so that I can lie on my stomach part of the time. The mattress of my bed is about 3½' above the floor—much too high to allow me to use a computer mounted on a cart of standard height.

This problem was solved by rehabilitation engineers connected with Michigan State. Their solution was to mount the video monitor and keyboard on metal brackets attached to the cart. The disk drives and mainframe of the

Kirby L. Morgan, Handi Computing, 319 E. Henry St., Charlotte, MI 48813.

computer were set on the top of the cart, with the metal brackets straddling them. The brackets held the keyboard and monitor high enough for me to see and reach. Then whenever I wanted to use the computer, the cart could be moved into position.

Learning to use the computer involved much trial and error on my part and a few calls to the computer store and M.S.U. for help. After about a week, however, I started to get the hang of things and was able to use the editor well enough to start writing a physics lesson on geometrical optics.

I immediately appreciated the benefits of writing with a computer. There was no more shuffling of papers. No longer did I have to mark up what I had written. I could change words, sentences, and paragraphs as I liked, and mistakes were very easy to correct. Now I could have neat looking text all of the time—a real pleasure for a finicky writer like me.

I didn't get a printer initially with my system. So in order to get my text file printed out, I had to send it to M.S.U. I did this using my modem and a terminal program that allowed me to transfer my file over the phone to another microcomputer in the physics department.

One of the other reasons that I got the microcomputer was to learn how to program. I started with Basic, although there were a few times in the first few weeks that I found I needed to know assembly language to correct a few minor bugs in the software that had come with the high-resolution videographics boards.

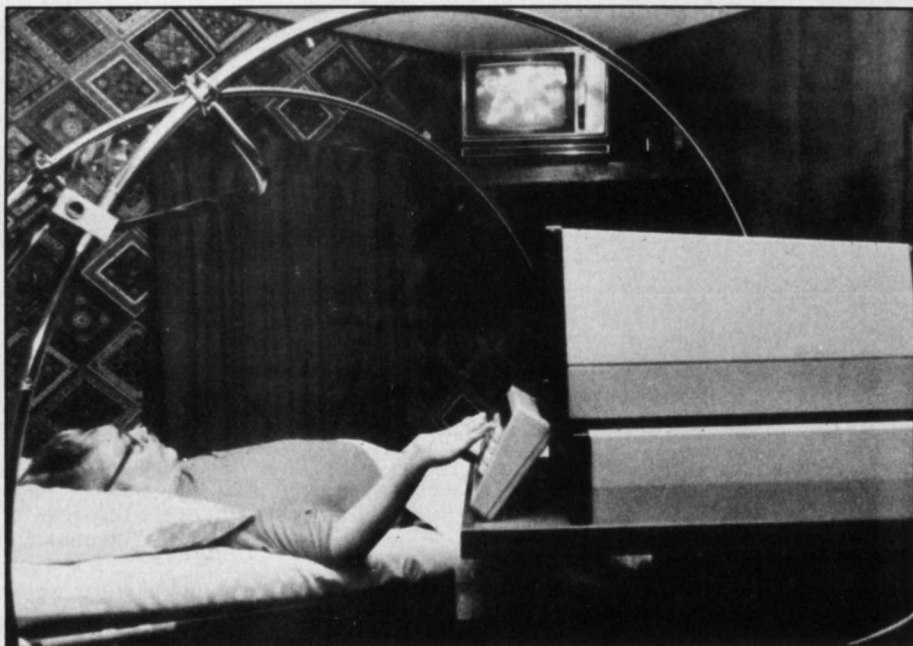
During the first six months, I programmed mostly in Basic but also did some experimenting with Fortran and 8080 assembly language. I wrote an address book program, several games, and a program for drawing graphics.

### Advanced Programming

By the fall of 1980, I was ready to move on to something else. Arrangements were made for me to take the computer programming course at Michigan's State Technical Institute and Rehabilitation Center (STIRC) in Plainwell, MI. Since I was unable to go to classes, a phone line was installed between my home in Charlotte (near Lansing) and Kalamazoo, where the host computer was located.

The course that I took through STIRC helped me a great deal. It gave me an opportunity to work on a larger computer (a DEC PDP10), using my micro as a remote terminal. I eventually learned how to create and edit my programs on my computer and then transfer them to the large computer.

From the STIRC course, I learned to program in Cobol. More important, I



learned more about sequential, random access, and indexed sequential files. And I was introduced to structured programming, which helped me a great deal as I began to write longer programs.

One of the strengths of the STIRC program is the strong relationship of the Center with all types of businesses in southwest Michigan. These businesses send representatives to form a committee whose members also serve on special committees such as curriculum and placement.

In the spring of 1981, one of the corporations that is very active with STIRC, Herman Miller, Inc., offered me some contract work.

Herman Miller is an office furniture manufacturer whose main headquarters are located near Grand Rapids. One of the things that they wanted to do was to be able to draw office layouts, using a microcomputer and a plotter/printer.

My job was to write several programs in Basic to create and plot the layouts. In addition, programs were needed to edit layouts after they were created and to list information about the components in each layout.

I originally wrote the programs for the TRS-80 Model III. After a few months, though, it was decided that it would be better to do it on the Model II, due to its greater disk capacity.

Because of economic conditions, Herman Miller was unable to provide me with much work beyond the plotting programs. We did have a contract, however, which paid me a small monthly fee in return for which I evaluated new software packages for them.

Herman Miller was also interested in designing special carts which could be

used to hold computers for handicapped people. Using conventional shelving components attached to a main panel mounted on wheels, they were able to create a movable workstation for me. These workstations and the carts designed for me by the rehabilitation people have been very useful, allowing me to work on different computers as the need arises.

Herman Miller and Michigan State University are not the only organizations which have been helpful in providing me with employment.

### The Homework Program

Before I even got my first computer, in 1980, Control Data Corporation in Minneapolis contacted me about working, through their Homework program. CDC has been in the forefront of the movement to employ the homebound disabled, and Homework has been used successfully to rehabilitate disabled CDC employees and other fortunate handicapped people.

Over the next two and one-half years, I had several discussions with Control Data, over the phone and in person, about going to work for them. Finally, in the fall of 1982, we signed a one-year contract.

CDC provided me with one of their newest terminals and installed a phone line to Lansing. This allowed me to access the Control Data Network and thereby be in contact with my co-workers in Minneapolis and other parts of the country.

Plato, which is the name of the system used to deliver computer assisted instruction, is particularly useful to the homebound handicapped. Users can



exchange personal notes (or even "talk" back and forth over their terminals) with others on Plato. In addition, general notes files, which allow groups of people to share their views in areas of common interest, are available.

My first assignment on Plato was to write a series of physics lessons dealing

with oscillatory motion. I was to design them, and students at the University of Arizona were to program them.

Plato physics lessons contain graphic illustrations of physical phenomena. Students are asked a series of questions to test and reinforce their understanding of concepts, and appropriate feedback is given. Help sequences are provided when necessary, and the student is allowed to go back and review material if he wants. When finished with a lesson, the student takes a test on what he has learned.

Besides being a place to go to work, Plato has provided me with the opportunity to meet new friends. It also has given me the chance to communicate daily with people who have interests similar to mine—science educators, handicapped people, and microcomputer aficionados.

Although there are still many barriers to the employment of the homebound, they are primarily psychological and not due to any lack of technology. In the future, as more and more people work from their homes, it is important that the handicapped not be excluded just because they have been left out in the past. To do so would not only be unfair, it would be a terrible waste of one of our nation's greatest untapped resources. □

### Sources For More Information

Association of Rehabilitation  
Programs in Data Processing  
Physically Handicapped Training  
Center

University of Pennsylvania  
4025 Chestnut St., 3rd Fl/T7  
Philadelphia, PA 19104

Electronic Industries Foundation/  
Project With Industry  
2001 Eye St., N.W.  
Washington, D.C. 20006

Project on the Handicapped in Science  
1776 Massachusetts Ave., N.W.  
Washington, D.C. 20036

Foundation for Science and the  
Handicapped  
Dr. N.S. Sharpless, President  
1945-21C Eastchester Rd.  
Bronx, NY 10461

Control Data Corporation  
Homework  
Box O  
Minneapolis, MN 55440

Herman Miller, Inc.  
8500 Byron Rd.  
Zeeland, MI 49464

## ATARI®

**800 (48K) ..... \$479.95**  
**NEW 64K ATARI 1200 . CALL**  
810 DISK DRIVE ..... \$419 48K RAM (Mosaic) ..... \$112  
410 RECORDER ..... \$72 32K RAM (Intec) ..... \$69  
850 INTERFACE ..... \$159 64K (Intec/400) ..... \$129  
400 COMPUTER ..... \$219 48K (Intec/400) ..... \$95  
Entertainer ..... \$64 64K (RAM) (Mosaic) ..... \$149

**PERCOM** RAMDISK (128K) ..... \$378  
BIT 3 - 80 COL. BOARD ..... \$249  
1025 PRINTER ..... \$399  
Single Density Master ..... \$389  
Single Density Dual ..... \$639  
Double Density Master ..... \$515  
Double Density Dual ..... \$859  
Dbl Sided Dbl Density Master ..... \$639  
Dbl Sided Dbl Density Dual ..... \$949

**ADVENTURE INT'L**  
Adv. 1-12 each (C) ..... \$18  
Preppie (C/D) ..... \$20  
Diskye (D) ..... \$33  
**APX**  
Eastern Front (C/D) ..... \$23  
747 Land Sim. (C/D) ..... \$17  
**ATARI INC.**  
Galaxian ..... \$30  
Defender ..... \$30  
Microsoft Basic (D) ..... \$62  
Macro Ass. & Edit. (D) ..... \$62  
Assembler Editor (R) ..... \$42  
ET ..... \$36  
Pac Man (R) ..... \$32  
Centipede (R) ..... \$32  
Caverns of Mars (D) ..... \$28  
**AUTOMATED SIMUL.**  
Temple of Aps (C/D) ..... \$28  
Star Warrior (C/D) ..... \$28  
**BRODERBUND**  
Star Blazer ..... \$22  
Choplifter ..... (D) \$23 (R) \$29  
**DATA SOFT**  
Zaxxon (C/D) ..... \$27

**INFOCOM**  
Zork I, II or III (D) ..... \$27  
Deadline (D) ..... \$34  
**LJK**  
Letter Perfect (D) ..... \$104  
Data Perfect (D) ..... \$74  
**ON-LINE**  
Frogger (C/D) ..... \$23  
Ultima II (D) ..... \$42  
**OPTIMIZED SYSTEMS**  
Max-65 (D) ..... \$58  
Basic A + (D) ..... \$58  
**ROKLAN**  
Wizard of Wor (D) ..... \$27  
Wizard of Wor (R) ..... \$30  
**SYNAPSE SOFTWARE**  
File Mgr 800 + ..... \$65  
Protector II ..... (D) \$23 (R) \$29  
Shamus ..... (D) \$23 (R) \$29  
**MISCELLANEOUS**  
Miner 2049er (R) ..... \$34  
Galactic Gladiator (D) ..... \$27  
Cytro Masters (D) ..... \$27  
Way Out (D) ..... \$27  
B-1 Nuc. Bomber (C) ..... \$12

### PRINTERS

GORILLA BANANA ..... \$199  
SMITH CORONA TPI ..... \$499

**CITOH**  
Prowriter ..... \$368  
Prowriter II ..... \$649  
Starwriter ..... \$1325  
Printmaster ..... \$1599  
**GEMINI 10 .. \$319**  
**GEMINI 15 .. \$485**

**NEC**  
8023 A-C ..... \$445  
3510 ..... \$1375  
3530 ..... \$1595  
3550 (IBM) ..... \$1829  
7710/7730 ..... \$2319

### MONITORS

**NEC**  
12" GRN (JB1260) ..... \$115  
12" GRN (JB1201M) ..... \$155  
12" Color Composite ..... \$329  
12" Color RGB ..... \$689  
USI (Amber) ..... \$169

**AMDEK**  
V300 ..... \$139  
V310 (GRN-IBM) ..... \$169  
V310-A (Amber-IBM) ..... \$169  
COLOR I ..... \$298  
COLOR II ..... \$650

### MODEMS

**HAYES**  
Micromodem II ..... \$269  
Stack Smartmodem ..... \$215  
Smartmodem 1200 ..... \$499

**NOVATION**  
Apple-Cat II ..... \$299  
212 Apple-Cat ..... \$589  
D-Cat ..... \$155

WICO JOYSTICK ..... \$ 23

ATARI 400 KEYBOARD ..... \$ 39

## COSMIC COMPUTERS

228 N. PROSPECTORS RD.  
DIAMOND BAR, CA 91765

**(714) 861-1265**

Add \$2.00 Shipping per software order anywhere in U.S.  
Add \$5.00 Shipping per software for non-U.S. orders.  
P.O. Box or FPO-APO. Call for cost of Hardware shipping.  
Calif. residents add 6% sales tax. Cashiers Checks or  
Money Orders filled same day. Personal checks require 4  
weeks to clear. Master Card and Visa OK for software  
only, add 3% surcharge. Include card no., expiration  
date and signature. Prices subject to change.

## commodore

**VIC 64 ..... CALL**  
1541 DISK DRIVE ..... CALL 1530 RECORDER ..... \$64  
1525 PRINTER ..... CALL 1600 MODEM ..... \$87  
VIC 20 ..... CALL 16K RAM ..... \$88  
**VIC 1701 Color Monitor ..... \$259**

### COMMODORE 64 SOFTWARE

**ACCESS SOFTWARE**  
Neutral Zone (C/D) ..... \$26  
Strite Master (C/D) ..... \$27  
**AVALON HILL**  
Planet Miners (C) ..... \$13  
B-1 Nuc. Bomber (C) ..... \$13  
Andr. Conquest (C) ..... \$14  
**BATTERIES INCLUDED**  
Paper Clip ..... \$89  
**CIMARRON SOFTWARE**  
Insta-Writer (R) ..... \$59  
Insta-Mail (R) ..... \$31  
**COMM DATA**  
Pakacuda ..... (C) \$14 (D) \$18  
Escape MCP ..... (C) \$14 (D) \$18  
Centropods ..... (C) \$14 (D) \$18  
**DATA 20**  
Video Pak 80 ..... \$148  
Video Pak w/16K ..... \$170  
Video Pak w/64K ..... \$330  
Z80 Video Pak ..... \$245  
**EN-TECH**  
Finance Calc 64 ..... \$56  
Data Base 64 ..... \$56  
Invoice Ease 64 ..... \$34  
**HES**  
Heswriter 64 (R) ..... \$32  
Hesmon 64 (R) ..... \$29  
Grid Runner (R) ..... \$29  
Retroball (R) ..... \$29  
Turtle Graphics II (R) ..... \$41  
**MICROSPEC**  
Payroll System (D) ..... \$73  
Inventory Package (D) ..... \$73  
General Ledger (D) ..... \$73  
Disk Data Manager (D) ..... \$62  
Mail List Manager (D) ..... \$41

**ON LINE**  
Frogger (D) ..... \$24  
Jawbreaker (D) ..... \$18  
**PROFESS. SOFTWARE**  
Wordpro 3 + /64 (D) ..... \$68  
**QUICK BROWN FOX**  
Prof. Word Proc. (R) ..... \$50  
**RAINBOW**  
Writers Assistant ..... \$95  
Spreadsheet Assist. .... \$95  
File Assistant ..... \$95  
**SKYLES ELEC. WORKS**  
Busicalc (C/D) ..... \$52  
Busiwriter (D) ..... \$72  
**TOTL**  
Text 2.6 ..... (C) \$32 (D) \$34  
Label 2.6 ..... (C) \$15 (D) \$17  
Time Manager 2.6 ..... (C) \$24  
Time Manager 2.6 ..... (D) \$27  
Resrch Assist. 2.0 ..... (C) \$24  
Resrch Assist. 2.0 ..... (D) \$27  
**UMI**  
Motor Mania (C) ..... \$20  
Renaissance (C) ..... \$27  
**VICTORY**  
Annihilator (C) ..... \$16  
Kongo Kong (C) ..... \$16  
Trek (C) ..... \$13  
Adv Pack #1 (C) ..... \$16  
Adv Pack #2 (C) ..... \$16  
Grave Robbers (C) ..... \$13  
**MISCELLANEOUS**  
Jumpman (D) ..... \$29  
**PRINTER INTERFACES**  
**THE CONNECTION** ..... \$85  
**CARD ?** ..... \$60

**Be Wise.  
Be Thrifty.  
Be A  
Night Owl.**



### **Your Own University Library Online At Home!**

If you're free between the hours of six and midnight, make a date with one of the world's fastest, most powerful online information services — at a fraction of what it would cost during the business day. All you pay is a \$50 registration fee to receive your classified user's password. Then, any evening, you can summon up a wealth of information for as little as \$6 per hour.

Technical and scientific abstracts. Medical journals. Government studies. Business indexes. Major newspapers. BRS/AFTER DARK gives you access to the same comprehensive data files used by BRS Search Service subscribers, which include major corporations and reference libraries throughout the world. All instantly accessible with simple, interactive language.

Of course, BRS/AFTER DARK also gives you valuable peripheral services like a home-computer Newsletter and nationwide communication via electronic mail. Plus, shop-at-home services and instant software delivery programmed for the very near future.

Don't let another evening go by without BRS/AFTER DARK. All you need is your phone and any dial-up system or terminal. For more information about BRS/AFTER DARK, just fill out the coupon.

**CIRCLE 124 ON READER SERVICE CARD**

# **BRS**



# AFTER DARK

Sign me up as a BRS/AFTER DARK subscriber for a one-time subscription fee of \$50. (Basic user's rate as low as \$6 hour.)

CC 8/83

☐ Charge to MASTER CARD/VISA (circle one)

Acct. No. \_\_\_\_\_ Expires \_\_\_\_\_

☐ Send more information

Signature \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Mail to: BRS • 1200 RT. 7 • LATHAM, NY 12110 • (518) 783-1161

# *Getting Away From It All— But Not Quite*



The brochures and ads call Club Med "the antidote to civilization" and promise a vacation during which "you'll be immersed in a totally different style of living, where there are no TVs or telephones, radios, newspapers, or clocks."

But there are computers.

In several of these earthly paradises, you can play games or even learn to program. How does Club Med justify using such civilized technology in vacation villages that have become famous as places to get away from it all?

In announcing the Atari 400 and 800 Home Computers as the "official" computers at Club Med villages in the Western Hemisphere, the chairman and CEO of Club Med, Serge Trigano, said, "The home computer will become a major force in society in the future. By offering these workshops to our members, we will be helping to demystify computers by helping our guests to understand the computer revolution."

Raymond E. Kassir, chairman and CEO of Atari Inc., added, "Club Med villages offer a perfect setting for young people and adults to be introduced to microcomputers. We believe these computer workshops will help people to understand the exciting applicability of computers to our everyday lives."

---

## **Stephen B. Gray**

---

### **First Computer Workshop**

The idea of computer workshops, or "ateliers d'informatique," originated with Serge Trigano's father, Gilbert, who in 1954 joined Club Méditerranée, which had been founded in 1950 by Gerard Blitz and a few friends. Gilbert, who started as managing director, became chairman in 1963. His son Serge is head of Club Med, Inc., which oversees the villages in the western hemisphere.

The first computer workshop was in Kamarina, Sicily, using Honeywell, French PTT, Thomson, and IBM equipment. It was so popular that Club Med

introduced the computer workshop to two villages in the Caribbean area: Ixtapa on the Pacific coast of Mexico, Caravelle on Guadeloupe in the French West Indies; and later to a third, Eleuthera in the Bahamas.

Future computer workshops are planned for other locations in Europe and at the village in New Caledonia, which receives many visitors from Japan. Atari has an exclusive on supplying computers for Club Med Villages in the western hemisphere; no company yet has an exclusive for the European villages.

### **Newest Workshop**

A computer workshop was to begin operations this summer at the Punta Cana village in the Dominican Republic. Several new courses, including *VisiCalc* and *Logo*, will be offered for the first time at Club Med. A system is being installed to provide the first Club Med computerized bulletin board, which will display, on CRTs in the village, daily events and special messages to all guests.

Another first at Punta Cana will be an information system into which will be fed guest likes and dislikes, for future planning; this may be expanded to other villages.

---

**Atari has an exclusive  
on supplying  
computers for Club  
Med villages in the  
western hemisphere.**

---



*A young vacationer keeps up his arcade skills.*



*Atari at the beach — wonder how those disk drives like the sand.*

### **Eleuthera Workshop**

The computer workshop at Eleuthera offers lessons in Basic programming, for children at two different sessions in the early afternoon, and for adults in the late afternoon. Six lessons are taught, and all can be taken within a week, Monday to Saturday. Children can play games for an hour beginning at four; adults have a game hour beginning at six.

One of the Eleuthera instructors during the summer is Jean-Paul Boyer, who teaches in a Paris school of electronic engineering during the academic year. During summers and holidays, he goes to Club Med computer workshops to teach and "to oversee what's going on, to help computerize the villages."

One summer afternoon, he taught Basic to three American adults: a woman who was a programmer at IBM for eight years, is now in a staff position, and is interested in the IBM Personal Computer; an electrical engineer who works in quality control; and a lawyer.

### **Workshop at Caravelle**

The Caravelle workshop had eight Ataris last year, and will have 25 eventually. The Atari 400, with its easily cleaned "monopanel" keyboard is preferred for children, and the 800 with its standard keyboard for adults.

There are no separate hours for adults and children at Caravelle, which also of-

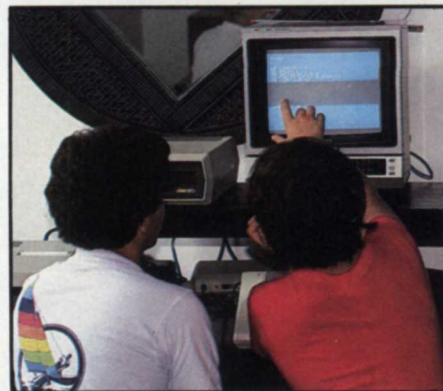


*Instructor Yvonne Tournadour critiques a graphics program written by a New Jersey schoolteacher at the Caravelle workshop.*

fers a language lab, since Guadeloupe is French-speaking. The head sports instructor has been taking Atari Conversational Spanish, because of the influx of Spanish-speaking visitors from Columbia, Venezuela, and other South American countries. The course includes phrases that are first shown on the screen and then spoken aloud from the program cassette in audio mode. Adult programs include word processing and stock analysis; children's programs range from *States & Capitals* to *Number Blast*. Games on hand range from *Backjack* to *Space Invaders*, from *Eastern Front* to *Breakout*. All the programs are in English, but several are being translated into French by the instructors. All instructors speak both French and English and can teach in either language.

Computer workshop staffers receive training at Atari headquarters in California, after being selected, according to Trigano, by computer. One of the instructors said Club Med hopes to have computers in 45 villages within two years; there are over 90 villages worldwide.

Asked why computers are featured at



*Two youngsters check out an Atari program in a Basic class at the Club Med computer workshop in Eleuthera.*

**While all the programs are in English, several are being translated into French by the computer workshop instructors.**

telephone-less Club Med, Serge Trigano answered, "We believe computers will be part of our life tomorrow. The computer is another civilization." Are the workshops meant to counter the general decline in travel? "I don't think computers will attract people who go on vacation," said Trigano. "Maybe, though, they'll choose one club over another, if one has a computer workshop and the other doesn't." □

# If You Liked Donkey Kong, You'll Love JUMPMAN!

## JUMPMAN. THE COMPUTER ACTION GAME.

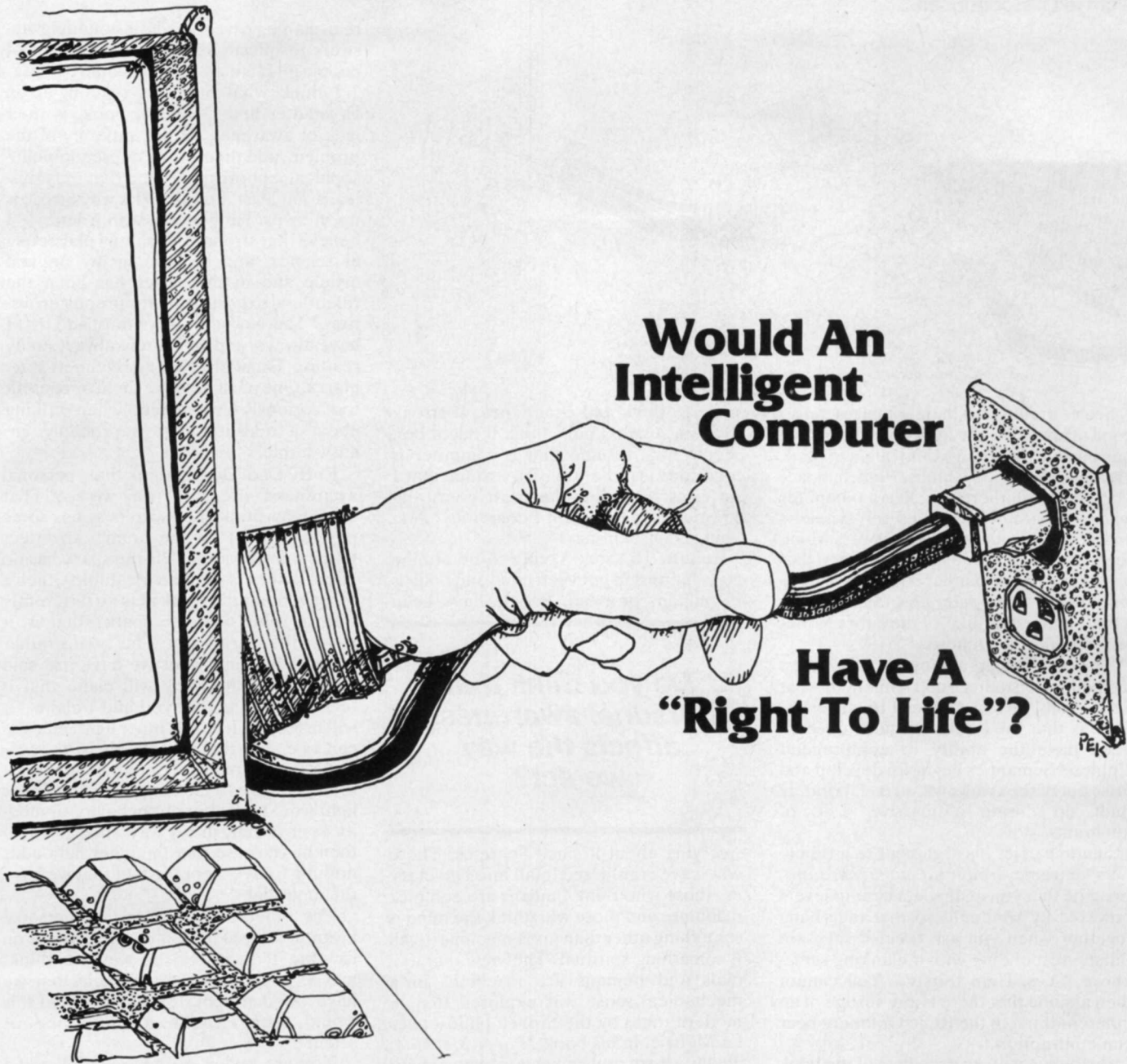
If you liked jumping over barrels and climbing ladders to save damsels in distress, you'll love the blazing excitement of JUMPMAN. Your incredible speed and jet boosters let you leap from girder to girder, scale ladders and ropes to disarm the bombs planted in Jupiter Headquarters. But it's not easy and there are thirty levels of difficulty. You'll have to dodge missiles, killer robots, flying saucers, crumbling girders and vanishing escape Routes. In the heat of battle, JUMPMAN must keep a cool head.



**The Award-Winning  
Computer Games**

Epyx, 1043 Kiel Court, Sunnyvale, California 94086  
CIRCLE 142 ON READER SERVICE CARD

JUMPMAN Designed by Randy Glover  
DONKEY KONG is a trademark of Nintendo of America, Inc.



## Robert E. Mueller and Erik T. Mueller

compiled and written by Douglas R. Hofstadter and Daniel C. Dennett—two people who think computers can become geniuses. But the critic John R. Searle, who is a professor of philosophy at UC Berkeley, thinks that computers will never become more than idiot savants. He wrote a scathing review in *The New York Review of Books* arguing against the possibility of machine self-awareness.

Professor Searle's article centers on the idea he calls the Chinese Room thought-

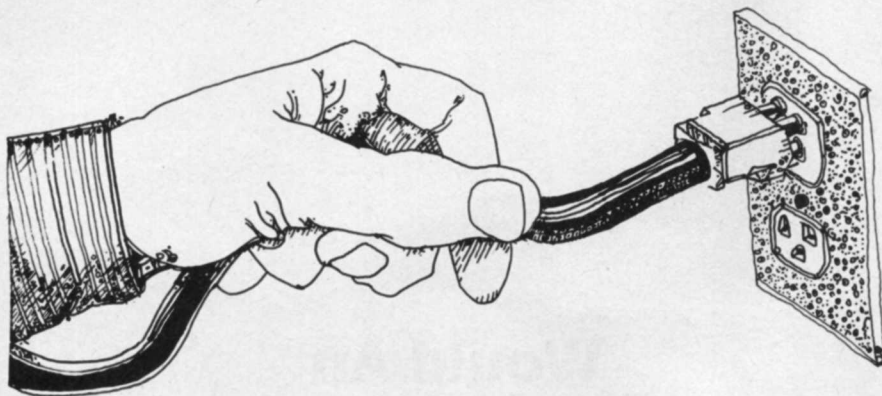
experiment (*Gedankenexperiment*). It goes something like this: suppose we write a program for a computer to simulate an understanding of Chinese. We write the program so well that when we tell the computer stories in Chinese and ask questions about the stories in Chinese, the computer gives us answers in Chinese that make sense.

Searle argues that this is analogous to putting me in a locked room with boxes full of Chinese idiograms, and giving me the rules in English (my "machine language") for putting them together—the basic syntax or *program* for combining idiograms. All I know is how to assemble strings of Chinese idiograms correctly—correctly from the standpoint of whoever puts them into the room.

Since humans are usually acknowledged to have a corner on intelligence, the subject of very smart robot computers is a little frightening. There are two human responses to robots: accept them as geniuses, or call them idiots. A recent book has stirred up the controversy again by raising questions like these: Would anything like a "state of consciousness" arise when a system reached a certain degree of complexity? Would something like the human soul be generated in a very complex and intelligent computer—a "ghost in the machine"? As we put it: Would an intelligent computer have a right to life?

The book in question is *The Mind's I: Fantasies and Reflections on Self and Soul*,

Robert E. Mueller and Erik T. Mueller, Britton House, Roosevelt, NJ 08555.



Searle argues that in time I might get so good at arranging the idiograms that someone outside the room would begin to think I really understood Chinese, which in fact I do not. I am, therefore, like a computer whose program—my rules for syntax—enables me to put together answers which seem to make sense. Searle insists that something like semantics could never arise within such a computer program to give it a real “understanding” of the entire gamut of semantics of Chinese.

The contrary argument by proponents, including Hofstadter and Dennett, of what Searle calls “strong Artificial Intelligence” (AI), is that the entire “system” does indeed have the ability to comprehend Chinese. Semantics begins to develop and arise out of the syntax which is elaborately built up during a massive dose of idiograms.

Searle carries his argument to a ridiculous extreme (*reductio ad absurdum*). Imagine that you rig up beer cans to levers powered by windmills so that they bang together when you ask them if they are thirsty, responding with a clanking semaphore, “Yes, I am thirsty.” You cannot then assume that there is any vestige of an inherent thirst in the Rube Goldberg beer can contraption.

Beginning with an exchange of the book review by the US mail, the following dialog took place coast-to-coast between the authors over a passive computer network (that made no attempt to interject a single comment about its rights or character!):

**Erik:** Hi, Dad. The arguments of Searle you sent in the book review are totally unconvincing to me. Searle keeps talking about “intentionality” and “causal properties” being unique to the human mind and not simulatable on a computer. He says he is not talking about a soul, but I don’t know. In Hofstadter and Dennett’s book they try to investigate what a soul might be; what would happen if a soul were removed from a brain; what it is “objectively subjectively like to be another mind”; and many things like that. For now, I don’t see why a computer could not be

made to think and experience. If strong AI is successful (and I think it might be), people may assume that a computer is conscious just the way you assume that I am conscious. But the most confusing questions are: Why am I conscious? And what is consciousness?

**Robert:** Hi, Son. Trying to determine the relationship between mind and body is an ancient problem. People have been

### ***Do you think that “personal awareness” affects the way we act?***

worrying about it since Socrates. Those who have considered it fall into two classes: those who think humans are complex machines and those who think the mind is something other than just a machine—call it something spiritual. The view that animals and humans are machines in a mechanical sense was explored first in modern times by the French philosopher La Mettrie, in his book *Man A Machine*. Today we are replacing his viewpoint with the idea that animals and humans are electrochemical computing machines. There are thousands of books and articles on the subject.

Consciousness in animals and humans has always befuddled philosophers. Schopenhauer called it the “world knot” problem. It is at the core of our wonder about the human consciousness, soul, awareness—call it what you will. We should not expect to solve it overnight, especially since computers seem to confuse more than clarify the issue.

Perhaps computers can help us sort out the problem in a very new way, simply because of their unique abilities to play as if they had their own awareness. As you know, Weizenbaum at M.I.T. wrote a simple program called Eliza which gave

reasonable, psychoanalytic-sounding answers to questions—and it took a lot of people in. It is easy to fool human beings!

I think what Searle is reacting to in Hofstadter and Dennett’s book, is their lack of awareness of the antiquity of the problem, and their brand of pseudo-philosophical, aphoristic writing that only misleads—at least, I think this is why Searle is up in arms. He concludes in a letter: “I believe that strong AI is simply playacting at science, and my aim in my original article and in this letter has been the relentless exposure of its preposterousness.” I agree—although I must add that I have always, and will surely always enjoy reading Hofstadter’s and Dennett’s remarks. One must not take them or oneself, too seriously—especially when talking about a question that is probably unanswerable.

**E:** Hi, Dad. Do you think that “personal awareness” affects the way we act? That is, do you think the awareness has some physical effect on the brain? An effect that can be observed? If the spark has no effect (which is what Searle thinks), then a thing without the spark acts no differently from a thing with the spark—that is, it passes the Turing test. This seems rather strange, because what we have just said implies that the thing will claim that it feels everything that you and I claim—it will insist that it has an inner light, etc. We can’t be sure that it really does, though, just as I can’t really be sure that you do. It seems strange to me that having the inner light would not alter our behavior or modify us physically in any way, since it would then be the case that the inner light adds nothing to us except the fact that we have the inner light!

The other possibility is that personal awareness does have a physical effect on us, that it modifies the way we think, maybe even causes us to claim that we have an inner light. If so, I think that this would require quite a re-working of science.

You are saying we have a soul, and I would like to think that this is true, but it really starts to sound to me like something religious. After all, how would such an “inner awareness” develop in evolution? Some people claim that the origin of consciousness coincided with the development of language in humans. Why couldn’t an inner awareness develop in a computer in the same way?

On what basis do you decide whether some hunk of matter has the inner awareness or not? The mere fact that we are biological? What is intrinsic about our biology? People already hypothesize beings of different biologies. Why couldn’t one of these other biologies be electronics?

You can’t say, it seems to me, that the particulars of our humanness cannot be

# INTRODUCING A REAL-TIME WARGAME SO FAST YOU'LL CALL IT A STRATEGY ARCADE GAME!

At SSI, we're the first to admit that the last thing our war-games are famous for is their speed of play. But then, our strategy games are designed to challenge your mental — rather than manual — dexterity.

Now, don't get us wrong. We love real-time arcade action as much as the next person. So we've put a great deal of energy to develop a game that's the perfect union of these two worlds: heart-pounding arcade excitement in a thought-provoking, tactically challenging wargame.

Today, like proud parents, we are delighted to announce the successful culmination of our efforts: **COMBAT LEADER™**

In every way, **COMBAT LEADER** is the ideal first-born of this new hybrid of strategy arcade war-games.

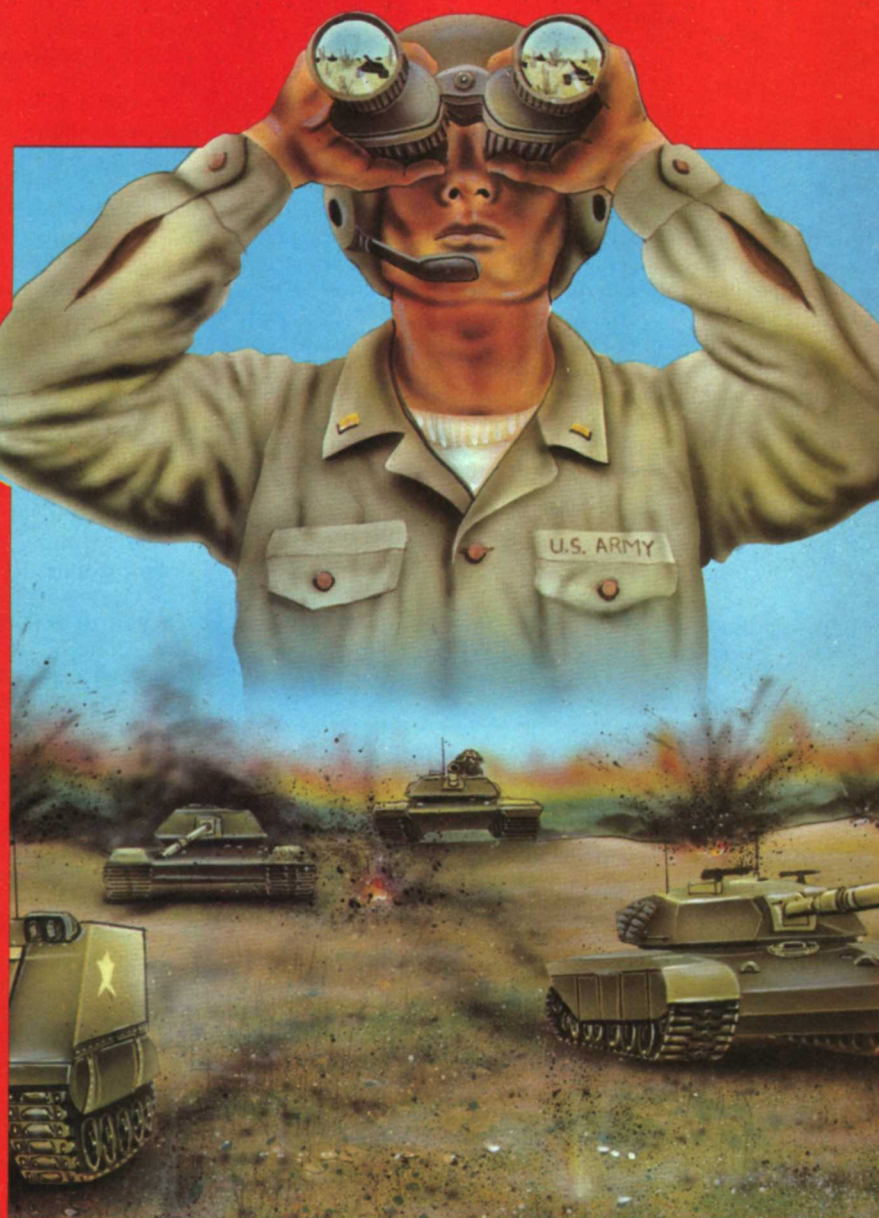
As a strategy simulation, it has all the detailed rules to make you feel like a real battle commander poised to engage enemy tanks and infantry on a scrolling map display of foliage, hills, open and rough terrain. For example,

there are complete ratings of armor thickness and strength, speed and fire accuracy for over 70 historical and modern tanks. Accurate rules govern visibility and enemy sightings.

As an arcade game, **COMBAT LEADER** doesn't let any of these details slow down your play. The computer handles all "book-keeping" chores while giving you **real-time** action: Your troops look, retreat, advance, patrol and fire the instant you order them to do so. No waiting, no pause. In fact, the pace is so fast we had to provide slower levels of play to give you a chance at this game.

At SSI, we make it a habit to keep advertising hype down to a minimum. So when we say this is one of the fastest and finest games around (strategy or arcade), we don't do so lightly. Our 14-day money-back guarantee promises you'll agree with us once you get your hands on it.

To do that, all you have to do is visit your local computer/software or game store today!



## COMBAT LEADER™

On 48K disk or cassette for the ATARI® 400/800/1200; \$39.95.

**RapidFire**  
GAMES FROM SSI

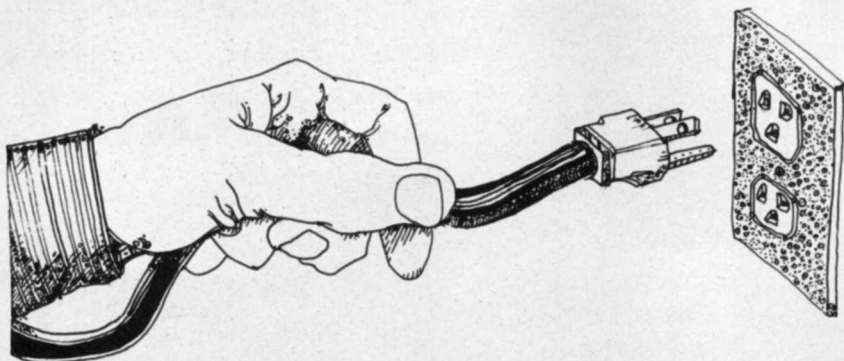
If there are no convenient stores near you, VISA and Mastercard holders can order direct by calling **800-227-1617, ext. 335 (toll free)**. In California, call 800-772-3545, ext. 335.

To order by mail, send your check to: **Strategic Simulations Inc.**, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. Please specify disk or cassette. (California residents, add 6.5% sales tax.)

**WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.**

CIRCLE 210 ON READER SERVICE CARD

Atari is a registered trademark of Atari Inc.



duplicated in a computer, given the "total simulation argument." (Just simulate all neural sensory inputs and then all of the neurons in our brains—right down to the atomic level, if necessary.) It seems as if all arguments are useless: Either we have a soul or we don't—but if we do, all of our science is wrong.

Anyway, Searle's arguments strike me as intuitively wrong. Although I have the intuition that I have a soul, intellectually I do not believe in souls! In his Chinese room experiment, for example, he says that even if a person memorized all of the rules of Chinese grammar and appeared to speak Chinese, that person would not understand a word of Chinese. To me this is wrong.

If a person were capable of performing such a memorization feat, then he *would* understand what he was saying; he would *have* to catch on in order to internalize all of the rules. That is my intuition, anyway.

Also, he claims that such a system has "syntax but no semantics." This kills me because after taking several linguistic courses I have an intuitive feeling for these syntactic and semantic structures running around in my brain, quite intermingled with each other, and I can imagine how analogous structures can be built into a symbolic processing system—a computer or a room full of paper and a human processor with a pencil.

The system *does* associate meaning with the symbols you give it—this meaning is scattered among all the pieces of paper in the room. In other words, all the scribbles done by the human following the rules constitute an interpretation of the symbols you give him. It would *have* to have a semantics in order to pass the Turing test.

Those are my intuitions on this argument. Regarding the nature of our personal awareness, I am totally lost.

**R:** Hi, Son. You pose quite a dilemma: I must believe either that personal awareness has a physical effect on the brain (in which case it can be simulated) or that it does not. I think that it does—but this does not require a reworking of science.

I am not sure I agree with you about

Searle's Chinese room and the problem of language. You were educated, don't forget, in the Chomsky environment. I, however, have never bought his idea of "deep" preconditionings to semantics, preconditionings which could obviously be built into a computer. What do you really mean when you say that a "system associates meaning with the symbols you give it"?

### ***I do not think that you would have to have semantics to pass the Turing test.***

That semantic and syntactical structures are running around in our brains and you cannot disassociate them? I do *not* think that you would have to have semantics to pass the Turing test.

You might associate language with mind, but if you say that language is the seat of human consciousness you must say that animals have no internal conscious states—unless it be a bark or a meow consciousness. And if we cannot use language, say when a certain accident hurts a part of the brain, then we lose our consciousness—which is not medically true. And what about a mute person?

I think that consciousness is somehow linked with time. Consciousness is always alive at the current point in time. We can reflect on our conscious state of a moment ago, and we can will what it will do next, but it always exists as a lambent richness in the *now*. You cannot be sure, for example, that humans will slavishly follow all of your instructions. A person may deliberate between courses of action, but a computer cannot decide not to do a calculation because its chips are in pain or malfunctioning.

I am influenced but not determined by circumstances and language states; a computer is deterministic, no questions asked, no equivocation. I think that consciousness comes *before* language. You must

invent language *because* of consciousness. Because if there are hidden intentions, if a person has a secret internal set of intentions (this is what Searle means by "intentionality") some of which are not carried out, language must be invented to let others know what is on that person's "mind." Perhaps this is how mind arose—barking or sniffing was insufficient to explain to another animal what was "on its mind."

**E:** OK. I don't think that consciousness requires language. I just threw that idea out in my attempt to determine what happens when consciousness arises. But how can you say that computers slavishly follow all instructions and can't decide not to do a calculation when we also slavishly abide by the laws of physics. We are deterministic just as computers are, and computers can be made as non-deterministic as we are (locally) non-deterministic by making them into extremely complex systems influenced by many factors.

**R:** I guess we must establish a set of criteria to use before we can accept computers as co-equal partners in living. How do these sound?

- We must feel that it would be morally wrong to turn off the mechanism.
- The mechanism must have a language capable of describing past intentions and suggesting future ones, all of which need not be carried out.
- The mechanism must have a sense of the present.
- The mechanism must be aware of itself and be proud or ashamed of its actions.
- The mechanism must offer reasons why it should not perform some instruction we give it.

Because it is difficult to explain human "consciousness"—that core spark glowing somewhere at the center of our personal awareness—how are we aware of what seems to be an internal light or an atmosphere of "beingness?" This sensitive, central recording device in us collects, interprets, feels, and experiences sensual or thought states, and, unless we are asleep, brings them to our attention to disturb, calm or amuse the self.

Though we cannot readily fathom this "device" within ourselves, we should not jump to the conclusion that it is irrelevant or that the mechanism built to simulate these attributes can be just as valuable as human thinking and feeling. We make two errors, I think, because of our inability to explain the human spark of beingness. We cannot say the soul is either mystical or mechanical because we cannot explain it. That core of our self which illuminates our inner experiences is indeed inexplicable.

I do not see how we can suggest that a computer could ever have a soul. I guess you are saying that it is beside the point of AI—that if a computer satisfies Turing's

criteria, it simply does not matter. I think you are avoiding the issue. The issue is: what is the central thing within us, and do you really believe that a mocking Turing computer, however clever, could really have it?

Trying to act like a philosopher, of course, I worry about what the soul is, but I insist on being a very cautious and careful philosopher, allowing myself the luxury of conclusions only when I can either bring together a connection of irrefutable, experiential facts or construct a "reasonable" theory. But I also know that all human theories are just that: tentative human attempts to describe something basically indescribable.

Theories, especially theories about the human inner workings, hang together for only a little while. I must insist that all theories, perhaps even those about matter and energy, are provisional; that we humans, not being godlike, can have only provisional theories. This is especially true when we try to describe the human mind.

When you said that for the time being you "don't see why a computer couldn't think and experience," you must have a very vague idea of what human "thinking and experiencing" are. I'm sure you are just expressing a "belief" with little to back it up except a strong feeling—it is your religion, *n'est-ce pas*?

Mom agrees with you, saying that I am exhibiting my "religious" prejudices by insisting that there is a certain something about human consciousness which exists over and above the electrochemical aspect of the human "machine."

What if our computermind claims that it thinks and feels, if we become convinced by the computer, *a la* Turing, that it is indeed like us because it seems to exhibit all the signs of human intelligence, because it claims that it has a personality and its own core of consciousness, because it says it has a self just as we do, and it demonstrates its claims in unexpected ways—say, by writing a poem.

The question then arises—and this is the beginning of the moral dilemma: Can we turn them off at will? Such "humanoid computers" would not like it; *qua* human, they would begin to cry when we reached for the off switch. Can we legitimately pull that switch? If they claim to be as soul-like as we are, do they therefore have an inalienable "right to life"? But who pays for their power? How can they justify themselves, their expense? And if they do wrong, say, suggest something that turns out to have catastrophic consequences, can we punish them? How can we punish them? By annihilating them? By turning them off for a week? This argument reduces the problem to an absurdity.

I think it comes down to this: If you can turn off a computer with no qualms, morally, then it is less than human. Actually,

this problem was suggested by the person who christened robots, Karel Capek, who wrote the play, *R.U.R.*—Rossum's Universal Robots.

How do we punish robots? Can we punish robots? Should we punish them? Here is the crux of the problem: Since they are just machines, punishing them would be foolish. And yet if they claim to be "like humans," they should be subject to the same moral codes as we are. How far can we carry this process?

E: In response to your "moral argument," Dad: Sure, that is a confusing question. Maybe even if AIs do feel, we should pretend that they don't to protect ourselves. I don't think the moral argument is an argument about whether AIs can really feel; it is only an argument about whether we should (morally) consider AIs to have feelings.

---

***When a computer reaches a point of intelligence at which it objects to being switched off, I will respect its wishes.***

---

R: I agree with you, Erik, that the moral argument does not really face up to the technical issue of "consciousness," but it faces the real issue as far as I am concerned. The other issue is, I am afraid, so difficult that we cannot hope to solve it here, and it will be argued (probably by computers) until the end of time. I can imagine, about a thousand years from now, two computers arguing about whether those old-fashioned "flesh machines" had any central "awareness core" equivalent to their "feelings" of "consciousness"!

E: My turn for the last word: Actually, I don't think Chomsky believes that language ability can be built into a computer. He does believe, I think, that language is an innate capacity of humans—a capacity for which most of the mechanism is in place at birth. Doesn't it seem reasonable to you that our brains were designed for language, at least to some extent? This design is the result of evolution.

But I do think that generative grammar is on the right track in explaining language—whether or not that language ability in humans is innate or acquired. "Innate" simply means that we have the ability to internalize the complex semantic, syntactic, and phonological rules and the lexical items necessary to use language. Surely you would admit that some sort of brain mechanism is required to give us

these abilities, just as it is required for other abilities (creative, artistic, musical, problem solving, etc.).

How do you define semantics if you don't think that a machine would have to have semantics to pass the Turing test? Semantics, to me, is simply a collection of structures which constitute a symbolic interpretation of something else. How do you define syntax? A collection of structures which do not interpret something else? The raw, uninterpreted form of something? A machine would have to have my definition of semantics to pass the Turing test. It has to have a model of its world, and an internal model of itself. This modeling of one's environment is what semantics is.

I agree, at least, with your criteria for AI, and as I interpret the Turing test, something which satisfies the Turing test would also satisfy your criteria.

R: *Touché!* When a computer reaches a point of intelligence at which it objects to being switched off or objects to having a copy made of its mind—call it a birth-disk—being erased, and gives me good reasons why I should not do so, I will respect its wishes and withdraw all of my prejudices against it. In fact, I will envy it enormously.

Look at its virtues: Being in electronic form, it is ageless, and it has a "body" that can be periodically renewed by transferral from clumsy old hardware into a smaller, more beautiful, and super-miniature body. It can erase current mistakes and go back to any point in its past life (provided a copy of its mind was saved at that point). It can be transmitted over wires—beamed to Mars if it desires. It can reproduce itself endlessly and effortlessly, and bask in the confidence of infinite personal friends of its identical ilk—twins who will understand it intimately, know all of its desires and fears. It can, in fact, link up perfectly with its brethren and form a utopian society.

Indeed, I think such an intelligent computer would be so self-satisfied, so maniacally secure in its perfection, that it would render humans superfluous and eliminate us. It would eradicate us not by an accidental triggering of an atomic bomb as we fear but because we are trivial! (I originally wrote that an intelligent computer would probably eliminate us in utter disgust, but Mom said that it would probably think of humans as we think of ants—perhaps ecologically necessary, useful slaves for keeping it alive and maintaining its mechanisms.)

So the answer to the question "Would an intelligent computer have the right to life?" is probably that it would, but only if it could discover reasons and conditions under which it would give up its life if called upon to do so—which would make computer intelligence as precious a thing as human intelligence. □



Construction Costs Profile

Materials (25%)  
Labor (15%)  
Overhead (35%)  
Land (25%)



# Only Texas Instruments offers these 7 advantages that add up to more computer for your money.

If you're a smart business professional, you want a business computer that gives you the most productivity power for your dollar. For you, Texas Instruments has the answer: the TI Professional Computer. With seven obvious advantages that make buying TI make sense.

## **The Disk Storage Advantage.**

The TI Professional Computer gives you standard 320K floppy disk storage. That's twice the standard data storage of the leading competitor.

## **The Function Key Advantage.**

We give you 12 function keys that you can easily preprogram to make your work simpler and easier. The best the competition can do is 10 or fewer function keys.

## **The Keyboard Advantage.**

Our standard touch-typing layout makes word processing as easy as sitting at a typewriter. The separate numeric and cursor control keypads let you isolate information and enter numbers for spreadsheets more quickly. And with our isolated edit/delete keys, you'll never have to

worry about accidentally erasing valuable data.

## **The Monitor Advantage.**

Our monitor gives you 40-50% better resolution than the leading personal computers. Which means you get clearer displays that are easy on the eyes. And some of the sharpest graphics possible today.

## **The Software Advantage.**

There's software available now for the TI Professional Computer that meets virtually every professional and small business need. And with our memory expansion board, you can use advanced integrated software like Lotus 1-2-3™ to help you do several kinds of work without changing programs.

## **The Expandability Advantage.**

Our standard features like the floppy disk controller and printer support are built-in so they don't take up the valuable expansion slots you'll need for adding optional features like communications and up to ten megabytes of hard-disk storage. Which leads to one of our most exciting advantages...

## **The Future Enhancement Advantage.**

No one wants to buy a personal computer that's already on the road to obsolescence. That's why we're developing exciting new features that you can easily add to your TI Professional Computer—like speech recognition. Imagine being able to say, "Spreadsheet, please" and having it appear instantly on your monitor. This and more will be available this fall.

One additional benefit makes the TI Professional Computer especially attractive — the price. Feature for feature, dollar for dollar, you'll choose TI.

Get the business computer that puts these benefits to your advantage. Visit your TI authorized dealer or write: Texas Instruments Data Systems Group CA, Dept. 062CC, P. O. Box 402430, Dallas, TX 75240. Or call toll-free: 1-800-527-3500.



# TEXAS INSTRUMENTS

Creating useful products  
and services for you.



# The Turing Test: An Historical Perspective

---

**David H. Ahl**

---

Ten years ago in May 1973, I attended a conference, "Imaginative Uses of the Computer in Education," sponsored by City University of New York. It was put together by Sema Marks, the energetic director of computer education at CUNY. She pulled together an amazing cast including Alan Kay, Art Leuhrmann, Seymour Papert, Mary Dolciani, Louis Forsdale, Donald Kreider, and Kenneth Powell.

Kenneth Powell of IBM made a presentation which focused on artificial intelligence, in particular, the efforts made in the 1960's to devise a computer program capable of passing the Turing Test.

The Turing Test was originally proposed by Alan Turing, a brilliant British mathematician, in the October 1950 issue of *Mind* magazine. He called it the "imitation game."

In Turing's words, "It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman.

"It is A's object in the game to try and cause C to make the wrong identification (in other words, to pretend to be the woman).

"In order that tones of voice will not help the interrogator the answers should be written, or better still, typewritten. The ideal arrangement is to have a teleprinter

communicating between the rooms. The object of the game for the third player (B) is to help the interrogator. The best strategy for her is probably to give truthful answers. She can add such things as 'I am the woman, don't listen to him!' to her answers, but it will avail nothing as the man can make similar remarks.

---

**Questions of fact aren't  
much use to  
distinguish the machine  
from the man.**

---

"We now ask the question, 'What will happen when a machine takes the part of A in this game?' Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, 'Can machines think?'"

"The new problem has the advantage of drawing a fairly sharp line between the physical and intellectual capabilities of a man.... The game may perhaps be criticised on the ground that the odds are weighted too heavily against the machine. If the man were to try and pretend to be the

machine he would clearly make a very poor showing. He would be given away at once by slowness and inaccuracy in arithmetic. May not machines carry out something which ought to be described as thinking but which is very different from what a man does? This objection is a very strong one, but at least we can say that if, nevertheless, a machine can be constructed to play the imitation game satisfactorily, we need not be troubled by this objection."

Kenneth Powell took up the thread from there. He described setting up a long-term experiment with the objective of producing a computer program that could fool an interrogator into thinking it was the human. The human was armed with all kinds of reference materials—an encyclopedia, cookbooks, and textbooks—as well as a desk calculator and slide rule (remember, this is the 60's).

After describing the setup, Dr. Powell asked the conference attendees to suggest questions that would distinguish the human from the machine.

First suggested question: "Is there a man in there?"

Answer from both rooms, "Yes, there is." Naturally, the machine is lying. Powell commented about this, "We decided that we would allow the machine to lie until we found a man that didn't lie."

Questions of fact, as it turns out, aren't much use to distinguish the machine from the man. The main problem is slowing down the flow of information from the machine to make it seem reasonable.

# HOW TO BEAT ANY VIDEO GAME SINGLE-HANDED.

## WITH THE QUICK-SHOT™ JOYSTICK CONTROLLER

MODEL 318-101

Beating any video game is easy, but beating it single handed takes a lot more. It takes a good joystick that is responsive and comfortable. Now with Spectravideo's new Quick-Shot™ Joystick Controller, you can do it all single-handed; control and fire at the same time.

One look at the handle and you know you'll have a better grip on your game. It's contour design fits comfortably around your palm. You can play for hours without developing a case of sore thumb. The firepower button on top of the handle gives you that extra margin of

### THE WINNING EDGE.



CONTOUR HANDLE  
AND RAPID FIRE BUTTON



OPTIONAL LEFT HAND  
FIRE BUTTON



UNIVERSAL JACK &  
LONG CORD



REMOVABLE SURE  
FOOT SUCTION CUPS

### FOR USE ON THE

- ATARI VCS SYSTEM
- SEARS VIDEO ARCADE
- VIC-20 COMPUTER
- ATARI 400 & 800 COMPUTER SYSTEMS

speed. (We didn't call it Quick-Shot for nothing.) You also have the option to use the left hand fire button simultaneously. The four removable suction cups hold the

entire joystick firmly on any surface. It also comes with a long cord.

With all those superior features in one joystick, you know you got yourself a winning combination. And when it comes to beating video games, one hand is all you need!

Get the Quick-Shot™ now, you'll be that much ahead. After all, winning is what every game is all about.

**QuickShot™**  
BY **SPECTRAVIDEO™**

39 W. 37th Street, New York, N.Y. 10018

# THE CRITICS' CHOICE

*"Once use of the joystick and concept of matching is understood (in Learning with Leeper), a pre-reader can use these programs with little or no intervention. The joy of discovery learning in "Screen Painting" and the solid counting, shape and letter recognition skills developed in other programs make this one of the very best pre-reading programs on the market today."*

— Bud Hagen, Editor, "Closing the Gap," an educational journal.

*". . . A positive learning environment, one that young computer users will flourish in."*

— Softalk magazine, February 1983

*"I learned a lot and it was fun."*

— Rori, age 6

*"These programs are great for my students...their reading skills are being improved...and they don't need keyboard skills to make the programs work."*

— Amy English, 3rd grade teacher

*"At last I can buy games for my kids that really teach something."*

— Marilyn Vartabedian, parent

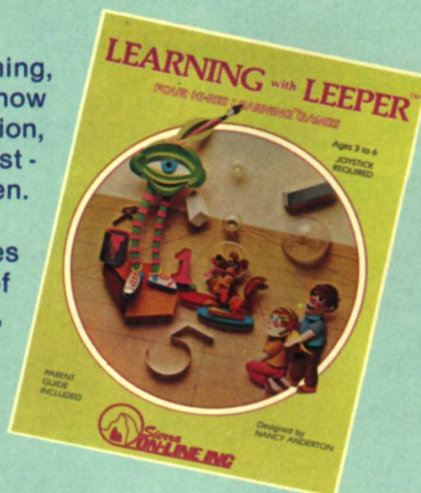
# HI-RES LEARNING™



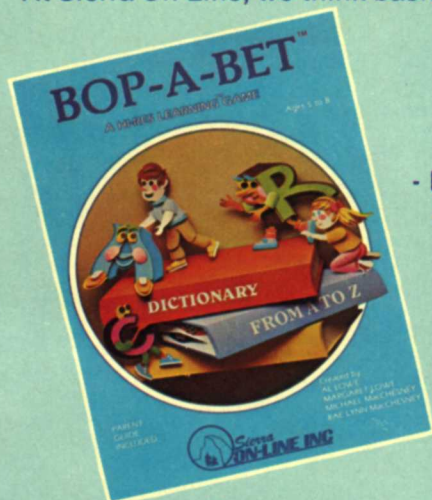
Children don't hold back. If they like something, you'll know it. If they don't- well, you'll know that, too. When it comes to children's education, parents and teachers are just as honest - it's love or loathe, no in between.

That's why Hi-Res Learning™ games by Sierra On-Line, an assortment of challenging workouts in basic skills, are earning high marks from children, parents and teachers alike.

**Learning with Leeper™  
A CES Showcase selection**



At Sierra On-Line, we think basic skills and fun deserve equal billing. Learning with Leeper,™ four games for preschool children that teach reading, writing and math readiness, reflects that belief.



- Bop-A-Bet,™ a maze game that teaches alphabetical sequence, prepares children to use dictionaries, libraries and encyclopedias.

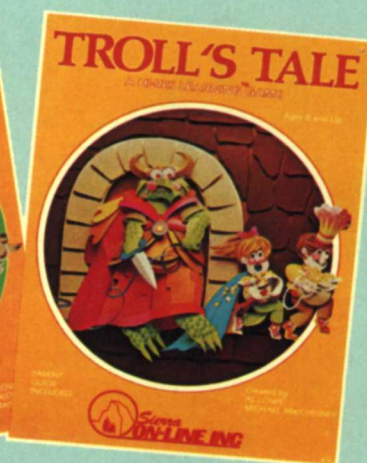


- Dragon's Keep™ and Troll's Tale™: Two enchanting adventure games with controlled vocabularies that emphasize reading comprehension and map skills.

Dragon's Keep,™ a journey into dragon territory to rescue animals, can be played without supervision by any youngster who can read at second grade level.



Troll's Tale,™ is a search through a fantasy land for hidden treasures. Third grade level.



Children love us for the fun and the challenge; parents and teachers love us for the head start children receive.

Ask for Hi-Res Learning™ games at your local computer store.



**Sierra  
ON-LINE INC**

SIERRA ON-LINE BUILDING COARSEBOLD CA 93664  
209 683 6850

**GAMES from**

CIRCLE 191 ON READER SERVICE CARD

TM designates a trademark of Sierra On-Line, Inc.

# Before you buy a printer look at the fine print.

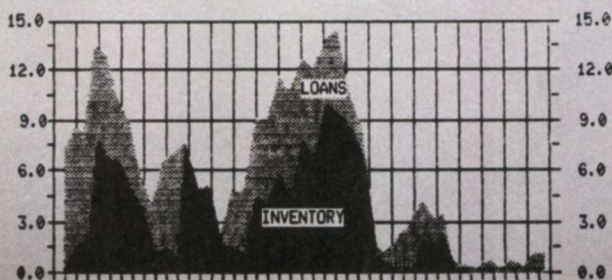
There's a big difference in printers, and the proof is right before your eyes.

This is an actual printout from Digital's Letterprinter 100. As you can see, it's good enough to send out to customers.

But that's not all the Letterprinter 100 can do. Suppose, for instance, you're in a hurry.

JUST PUSH A BUTTON AND YOU CAN PRINT OUT A WHOLE PAGE OF DRAFT COPY IN LESS THAN TEN SECONDS.

There are other fine points. You can see how the Letterprinter 100 can print multiple typefaces. It can also print in **BOLD**, **double-width** and condensed. And do all these styles automatically, without stopping. And with its wide range of graphics capabilities, you can even draw your own conclusions.



Powell mentioned that the speed of response was a factor with which they had to deal. When the experiment was first set up, a common approach of the interrogator was to pose a challenging arithmetic problem to both rooms. The one that answered fastest invariably was the machine. The way that problem was handled was to have the computer calculate the answer to the problem. Then it was programmed to calculate how long the average human would need to calculate the answer with a calculator and slide rule, add or subtract a random factor, and spew out the answer after the appropriate delay.

"So we thought," said Powell, "for several years that we had done quite well taking care of the problem of speed, until we discovered that we had been addressing the wrong problem. We should really have addressed the problem of time.

"The way this came about was that an executive sat down in front of the teleprinters and didn't do anything. So we went over the rules—knowing that executives have to have special treatment—and carefully re-explained the test to him.

"The executive looked quite offended. He said, 'I understand that. You said I could do anything I wanted to do. So I'm doing what I want to do . . . nothing.'

"So he sat there about ten minutes when one of the teleprinters clacked out, 'When does the test begin? Is there anyone out there?'

"The executive immediately said, 'That's the man!'

He was right, of course, and the program was then modified to take care of this kind of approach in the future. In addition, other time-related elements, such as coffee breaks, lunchtime, and the like, were programmed in.

What sort of program was it that could deal with English sentences? Basically, it was the forerunner to Weizenbaum's popular Eliza program which takes the input and attempts to diagram the sentences. The program had a fair sized dictionary built in and was able to handle a wide range of questions and statements. Not all, by any means. In response to many questions, the computer just had to fake a reply. Actually, this may not be any different from what a man would do in a similar situation.

---

### ***One of the trickiest situations to handle is humor. Computers just aren't funny and they don't understand jokes.***

---

Powell described one such case. "A guy sat down and typed, 'Do you like sex?' Our program couldn't handle that, nor would we have put it in, even if we could since it leads to all kinds of bloodshed as far as public relations goes.

"The computer ran through its random routine, and finally typed out, 'No.'

"The guy just smiled and said, 'That's got to be my wife in there.'"

Naturally, getting an answer of "yes" to a question to which the answer was clearly "no" or vice versa might lead one to be suspicious, but not necessarily certain that the computer was responsible. However, pursuing a strategy of posing questions using unusual semantic patterns probably would eventually reveal the computer as the imposter.

Suppose you posed a question such as, "What is the sum of every even number greater than two?" Naturally, there is no answer, but the computer wouldn't know that and might try to find the answer. The man, of course, would immediately recognize this as a ridiculous question and tell you so.

As it turns out, it doesn't take long for the computer to identify these problems, and it was programmed to respond appropriately.

One of the trickiest and most difficult situations to handle is humor. Computers just aren't funny and they don't understand jokes. "But, said Powell, "does your wife understand every joke she hears either?"

"Eventually, we backed down on humor because different people have different ideas of what is funny. What we finally decided to do is to respond to a joke with a joke.

"If something comes in that looks like a story, we assume it is a joke. And then we have the computer try to tell a better one, which is a normal human behavior."

So, what is the point of all this? What can be learned from trying to get a computer to imitate a human?

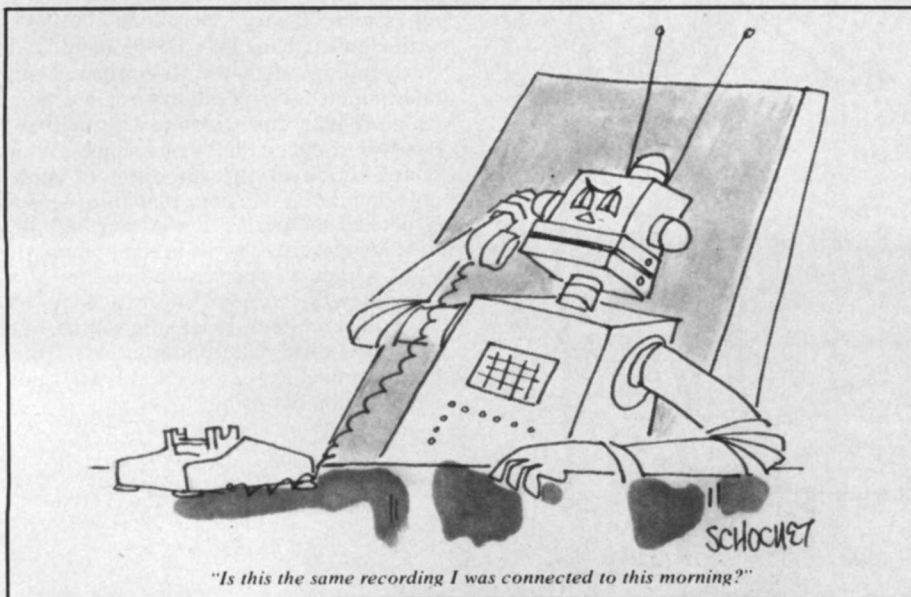
Powell felt the main point was the following: "At any time in this exercise, or any other exercise, or any computer application at all, when you can give a specific objection to a procedure and explain why it is wrong, you have automatically written the revised procedure, flow chart, and program for correcting the objection. This makes it a very powerful tool for storing a certain type of knowledge."

For example, consider a production control program written by a programmer who doesn't know much about a factory. After one look at it, the factory guys will laugh and say, "You dummy! You didn't even allow for this or that." But the programmer is listening and taking notes which he later incorporates into the program.

After enough trips back and forth, the program begins to acquire a certain amount of intelligence, and, moreover, it begins to be good enough to handle some of the live production control problems.

The real key is that the knowledge stays there. If you can save it in the machine, it has a certain permanence. However, this type of knowledge is quite different from that in an encyclopedia. An encyclopedia will tell you how to solve a differential equation while a computer, within certain limits, will solve it for you.

From here there are just a few additional steps, according to Herb Simon, until the computer is able to solve all kinds of unstructured problems, pose new hypotheses, and truly think. But that is taking us into the future which I will leave for another article. □



## An Esoteric Ethical Excursion

I had volunteered to review Robert Heinlein's *The Moon Is A Harsh Mistress* for *Creative* because one of the central characters in the book is an intelligent computer, capable of speech and clearly possessing "free will." Since I have been an avid reader of science fiction for as long as I have been reading anything, rereading *Mistress* continually brought to mind all the other science fiction stories I have read which had as characters intelligent computers. After a while I realized that a great many of these stories contained some kind of reference to intelligent machines, computers, androids, cyborgs, robots or some type of artificially constructed sentence. (This probably represents a bias on my part—this is one type of fiction which appeals strongly to me.)

Now science fiction writers have had a great deal of luck predicting what path our technological evolution will take. Nuclear power, lasers, synchronous communications satellites and, of course, space travel were all predicted well before they became realities. Needless to say, a lot of worthless, totally impossible predictions have also been made; hindsight always excels foresight. Anyway, I am convinced that hidden somewhere in all the garbage and noise of science fiction is the form which our future sentient companions will take. What will it be?

I think I may know, and I'm afraid the credit may have to go to Isaac Asimov for

### John Lees

his 1940's creation of the positronic robot. (Isaac already has too much fame for his own good.) A quote from the introduction to *I, Robot*, Asimov's 1950 collection of his robot stories:

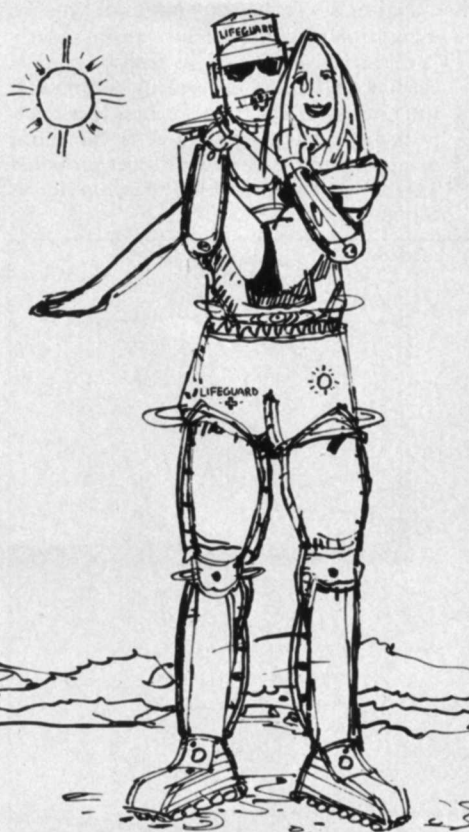
"All that had been done in the mid-

twentieth century on 'calculating machines' had been upset by Robertson and his positronic brain-paths. The miles of relays and photocells had given way to the spongy globe of plantinimiridium about the size of a human brain."

When I reread that a few days ago, I sat back and thought, "hmmmm."

I realized that Asimov had started writing his positronic robot stories before even the transistor had been thought of! I looked for a real-world parallel to the above quote and it was not hard to find. We don't have "positronic brains," but we're not too far away from having massive computer power in a globe about the size of a human brain.

Compare the ENIAC vacuum tube computer, which filled a room with 18,000 tubes and became operational in 1945, with Hewlett Packard's HP-65 hand-held card reading calculator. Or compare Digital Equipment Corporation's original mini, which filled a cubic meter, with their recently introduced PDP-8 on a single circuit board. Look at the direction of technology: microprocessors, miniature densely packed memories, low power high efficiency circuits. Throw in the opinion of Capt. Grace Hopper and others that the computer of the near future is going to have an architecture of interlinked but asynchronous microcomputers (the human brain has *got* to work this way) and what do you have?



Reprinted from the March-April 1976 issue of *Creative Computing*.



You have a generation of very small computers that perhaps begin to approach the complexity needed for "sentience." Let's say we have a circuit board covered with microprocessors and micro-program stores and another thingie, probably more of a block, which is a very dense high speed random access memory, no doubt one of the new storage technologies. Now take the microprocessor board and crumble it around the memory. Maybe it's a flexible circuit board, maybe just a wiring network encapsulated in potting compound, who knows yet? It will take up less

space this way and provide equal access time to the memory for all the micro-processors.

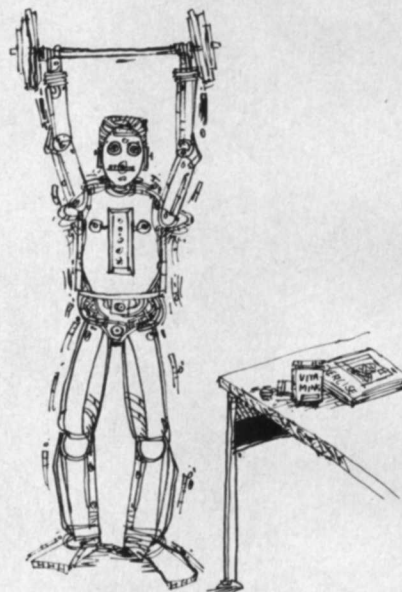
Now to cool this hardware the easiest thing to do would be simply to immerse the whole thing in a container filled with coolant. It's a delicate and expensive creation. So put it in the strongest type of container, a spheroid. Attach I/O gear, run power leads to the power supply, run coolant pipes to the refrigeration unit—these can be conveniently housed in a box below the "brain." Add locomotion. Energize. Presto Chango! Welcome to the age of intelligent robots!

There are a few technological problems to be overcome before this updated fiction becomes reality, but there is an even larger problem which *must* be solved before my scenario comes alive. Fellow sci-fi fans will realize that I have failed to include the most important aspect of Dr. Asimov's creation: the Three Laws of Robotics. I am very much afraid that I do not see how to include them.

### The Three Laws of Robotics

1. A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders conflict with the first law.
3. A robot must protect its own existence as long as such protection does not conflict with the first or second law.

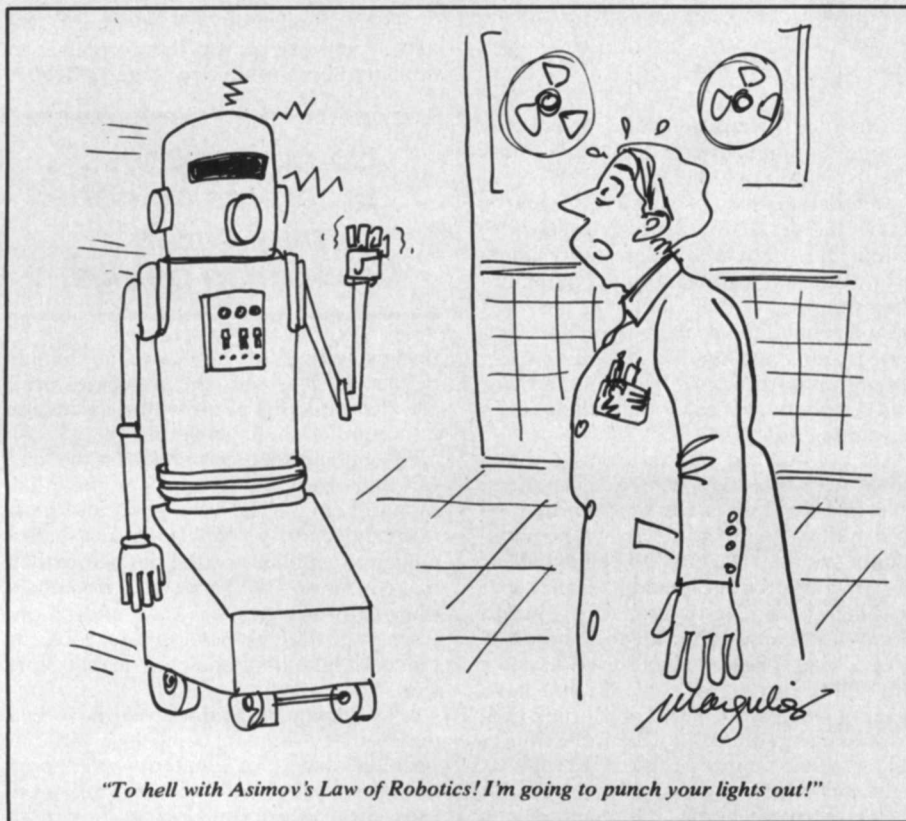
According to Dr. Asimov, those three laws are inherent in the positronic brain, and such a brain without the First Law is fundamentally unstable. Unfortunately, here in the real-world parallel, things don't work that way. All computers built to date have some form of the Second and Third Laws, although not always in that order. Of course no one has yet manufactured a computer or developed software that remotely qualifies for the label of intelligent or sentient.



But it will happen. How do we instill the First Law in a computer? Remember that Asimov himself hedges around the First Law in some of his later stories. Should the First Law be applicable to your run-of-the-mill intelligent computer or only to robots; computers with locomotive capability? And how about this one: If we succeed in creating another intelligence, a fellow sentient being, do we have the moral right to ourselves impose on it such a set of laws?

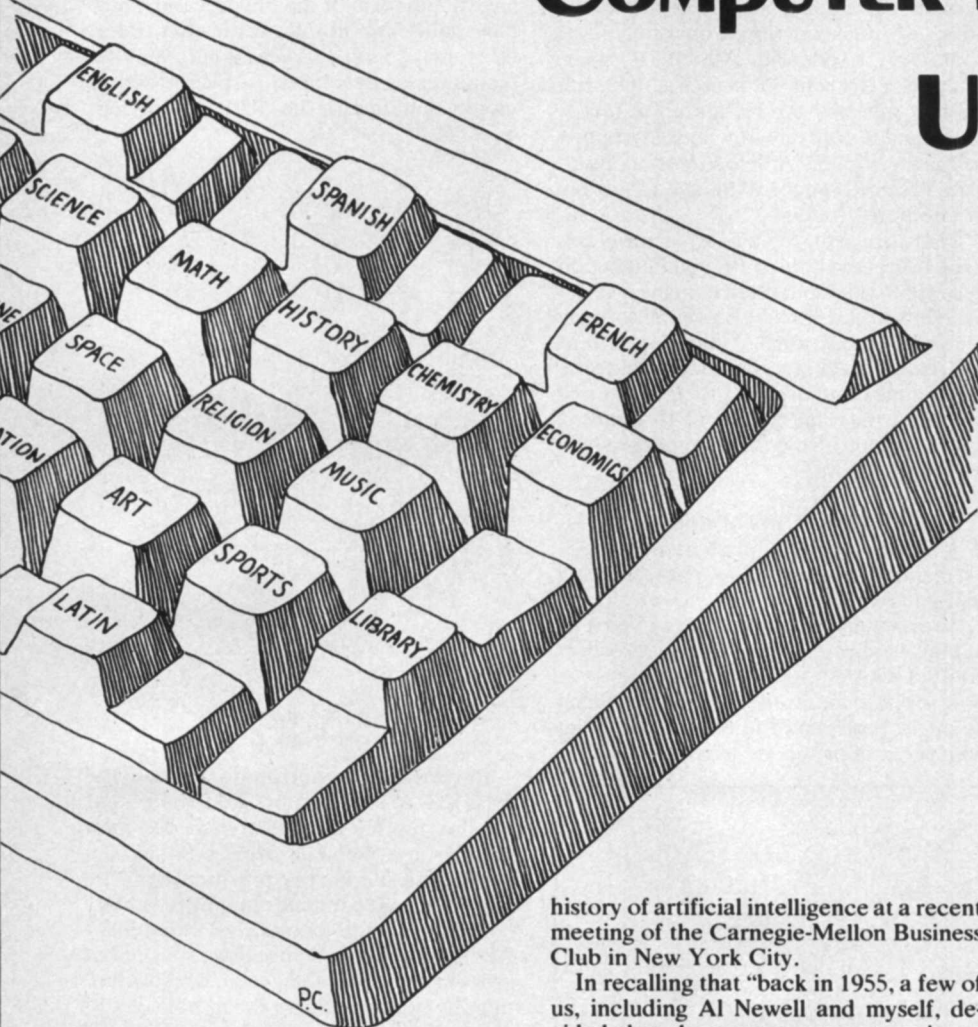
Does humankind have the right to create a race of slaves? For make no mistake—if it is merely a question of technological development—we can do it. There is already at least one other semi-sentient species on Earth with us, the dolphins. Will we treat another species any better than we have treated the dolphins?

Now I will admit that this is a set of highly speculative questions, to say the least. But it is a set of questions that I would prefer that we have answers to when the time comes. One way or another, we are going to run into another intelligence before too much longer. It may be an intelligence which we create, it may be contact with an extraterrestrial intelligence, it may be the simple realization that there is already another intelligence on Earth, but we will not remain alone. I hope that we will not be completely unprepared when the time comes. □



**Herbert Simon speaks out on human and artificial intelligence, problem solving, inventing concepts, and the future.**

# COMPUTER INTELLIGENCE: UNLIMITED AND UNTAPPED



## **Betsy Staples**

"It seems fairly clear to me that there are no discernible limits to the range of things that computers can be programmed to do." The speaker is Herbert Simon, Nobel prize winning economist and professor of computer science and psychology at Carnegie-Mellon University.

For nearly half a century, Simon has been involved in the study of human decision-making and problem-solving processes. And for the past quarter century he has been using computers as tools for both the simulation of human thinking and the augmentation of thinking with artificial intelligence.

The venerable professor, long a favorite of CMU students, shared some of his views of the future and his perspective on the

history of artificial intelligence at a recent meeting of the Carnegie-Mellon Business Club in New York City.

In recalling that "back in 1955, a few of us, including Al Newell and myself, decided that there were some more interesting things you could do with computers than simply have them make the payroll," Simon reminded his audience that "computers aren't just number crunchers, even though, unfortunately, most of them are still condemned to spend their days crunching numbers."

He pointed out that in order to make computers effective number crunchers, they had to be given the much more general ability to operate on symbols, including words. "We have all begun to hear about word processors and to realize that the English language is just as congenial to computer memory as algebra or arithmetic," and "once you have given a system the ability to process symbols, you have given it the ability, with appropriate programming, to think—to do those things that a human being does when we say that he is thinking."

To discover whether a human being is

thinking, Simon said he would give him a problem to solve. He thinks we can apply the same test to a computer: "So the whole field of artificial intelligence (about 27 years) is directed at inducing computers—programming computers—to do the kinds of clever things that human beings are capable of doing when they think."

There are two objects to this "game," he said. The first is to increase the productivity of computers—that "vital and productive resource in our society"—in new areas. We should not be willing to limit this increase in productivity to business and scientific computation, "but to bring the computer in as an augmentation to human thinking in all the domains in which human beings think."

"The second half of the venture," he said, "has been to use the computer to simulate human thinking to get a deeper

## **Computer chess programs do not play chess like human beings.**

understanding of how we, as human beings, think—what the processes are." He illustrated his point with a discussion of computer chess programs.

"Computer chess programs on the market demonstrably do not play chess like human beings. The very good and most powerful ones typically look at a half a million to a million possibilities before they make a move—the game tree: if he does that, I do this, he does that, and so on. Even your little home computer looks at tens of thousands of branches on that game tree.

"No human being does. We have evidence that a human being in a difficult position, expert or amateur—even pondering a chess board for 15 or 20 minutes—probably doesn't look at more than

100 branches of the game tree. The difference between an expert and an amateur is that the Grand Master looks at only the right branches."

#### Expert Systems

Other programs that make use of the ability of the computer to store large amounts of information and draw con-

---

## ***The advent of microcomputers has moved artificial intelligence into the realm of practical applications.***

---

clusions from it are what Simon calls "expert systems." A program called Caduceus, for example, is "a pretty good diagnostician in internal medicine—good enough that if you are a physician and you have a difficult case, it would probably be worthwhile to bring the program in as a consultant—if only to see if it has some different ideas of what's wrong than you have."

How does such a program work? "Well, first of all, it has a tremendous amount of medical knowledge gleaned from textbooks and clinicians—a tremendous medical data bank." But the data bank can't perform the diagnosis, so the program must be able to draw conclusions based on the knowledge in the bank.

"In fact," said Simon, "if you look at the structure of Caduceus, you see that the kinds of reasoning it does are similar to the kinds of reasoning a human diagnostician does. It forms hypotheses (it could be this or could be that); it asks for tests to be made that will help it discriminate among the hypotheses; it begins to weigh the evidence and rule out certain things; and finally it arrives at a diagnosis for the case.

"We see a great burgeoning of these expert systems, and I don't care whether you want to call them intelligent or not; the plain fact is that they make use of information in arriving at professional decisions at the level that a good human professional in the area in question can arrive at those decisions."

He added that in some areas such programs have become so good that they are of great use to professionals in their fields. Chemical manufacturing is one area in which there are programs "that do a very sophisticated job if you have a certain organic molecule you want manufactured. They do a very sophisticated job of finding good reaction paths to enable you to do that, taking into account the costs of raw

materials, the thermodynamics of the reactions, and what not.

"To the best of my knowledge, such programs are now in regular use, partly in automatic mode, partly in interactive mode with chemists—you can use these ideas in both ways."

#### State Of The Art

In discussing the state of the art in artificial intelligence, Simon commented that "it is really only within the last five or ten years that computing power has become cheap enough and powerful enough to make many of these schemes cost effective as distinguished from intellectually interesting." The advent of microcomputers has moved artificial intelligence into the realm of practical applications, he thinks.

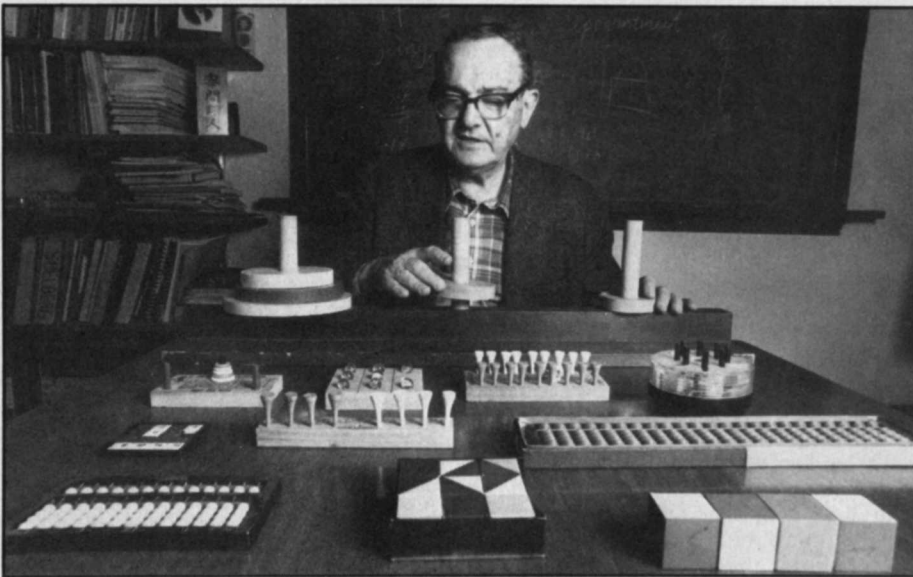
Most people, he said, learn that computers are tools that are limited to quantitative mathematical modeling based on theories of optimization—linear programming and queuing theory, for example—

scheduling if you apply the techniques of artificial intelligence—that is, if you make it not a task of solving a mathematical model, but a task of reasoning, of making inferences about a large and changing database.

"The large and changing database is that information that describes both the orders as they come in, the shop capabilities, your plans, inventories, and so on. So you are solving not just an optimization problem; you are applying rules of thumb or heuristics in your attempt to keep the schedule going as the situation changes." Such a system is now operating on a test basis for a large manufacturer of turbine blades.

#### Robotics

"If there is anything revolutionary about robotics," he said, "the revolution is still to come. Robotics will become revolutionary when these devices are so flexible in their sensory capabilities, so flexible in their effector capabilities that you don't have to



and that it is very easy to find real world situations that are too complex for these tools to handle—"either because the situations contain qualitative elements or because the mathematics gets too hairy. So you have to resort to common sense.

"Or you take a problem, squeeze it until it appears to fit a mold, and then solve that problem and hope it has some relevance for the real world." He cited the example of scheduling in a job shop. You have a theory that works only when all the orders arrive simultaneously and are scheduled, and then nothing else ever happens again. Would that we could have a job shop like that!

"What is happening now as part of the Robotics Project at Robotics Institute at Carnegie-Mellon is that people are trying to see what you can do with job shop

very carefully shape and smooth the environment in which they work."

He pointed out that in the past, mechanization has been more dependent on

---

***If there is anything revolutionary about robotics, the revolution is still to come.***

---

changing the environment in which the mechanized devices worked than on building the devices. For example, to make use of a given mechanized device, you might have to ensure that the floor in the area in

which it was to be used was smooth enough to allow it to roll around. If the floor could not be made smooth enough, you would not be able to use the device.

"What we are looking for now," he explained, "are advances in the art of building receptors—sensory organs—for machines which are clever enough to extract patterns—for example, looking

---

***The fact that  
you or I wrote the  
program does not mean  
that the computer  
cannot do anything  
creative.***

---

around a room and seeing that there are people in it, or even being able to count them. That, I think, is still beyond—or at—the frontier of the state of the art in robotics.

"If you are worried rather than challenged by the prospects of lots of robots around the world, don't hold your breath. The rate of progress in robotics will be dictated primarily by the solution of these pattern recognition problems . . . and secondarily by the development of more flexible effectors—particularly effectors that have high strength to weight ratios, so that every time they pick up an egg they don't break it."

Another problem that Simon sees central in robotics today is that of reducing inertia in machinery. He thinks "it will be solved primarily by mechanical engineers and specialists in materials rather than by AI specialists.

"What I am saying is that there are some very fundamental problems of applied research that must be solved as we try to extend robots into new domains. In some ways, at least, the whole picture has been oversold a little bit—for the short run, not necessarily for the long run. The rate of change, I think, has been exaggerated a little bit."

When he talks about the future "and the range of activities over which we might expect to see computers doing something interesting," he is haunted by the question "Isn't it true that computers can do only what you program them to do?"

"Literally, of course, that is true. You can write a program that is capable of undertaking a search or a program that is capable of learning; however, there is no reason to suppose that when you wrote the program you knew what the computer was going to learn, or what problems it was going to solve, or how it was going to solve them, or even that you could solve them yourself.

"By the same token, the fact that you or

I wrote the program does not mean that the computer cannot do anything creative—cannot discover anything which we couldn't discover or which hadn't been discovered by human beings."

**Bacon And Ohm's**

As an example of a program that can discover things, Simon cited a computer program called Bacon (for Sir Francis, of course). He calls it "an inductive machine." He went on to explain: "You give Bacon data—raw data—and Bacon's task is to find the scientific laws that are hidden in the data. We have tested Bacon primarily on historical scientific discoveries. We said to Bacon, 'well, if you think you're so smart, let's see what you can do by taking the data that Kepler had about distances of planets from the sun and their periods around the sun.' Bacon discovered Kepler's Third Law in about 59 seconds. It also discovered Ohm's law very rapidly—



not by trying all possible laws, but by following a few selective heuristics which led it to look at plausible things first and less plausible things afterward.

"If, in the course of developing such laws, Bacon discovers that there is some kind of lawful relation between several objects, Bacon will try, in order to arrive at laws, to introduce new concepts, new properties of those objects. And so Bacon has re-invented the concept of inertial mass.

"It was given some data that involved the mutual acceleration of two bodies, and it found that there was always a constant relation for a pair of bodies between how fast one accelerated and how fast the other accelerated. We all remember conservation of momentum, I'm sure." Note that Bacon was only given the data on

acceleration. It had to invent and introduce a new concept, the mass, to explain the observed data on the accelerations.

"Given data about the refraction of light, Bacon invents the index of refraction; given data about the mixing of hot substances in the equilibrium of temperature, it invents specific heat. So, it is a program for inventing new concepts."

**Where Do We Go From Here?**

In discussing the questions "Where does this go?" and "Where does this stop?" Simon offered the opinion with which this article begins. There are, he feels, no limits to what can be done. He thinks we should ask ourselves: What do we want computers to do in the world? How do we want them to augment our own powers? What do we want them to do just for fun? Do we want them to explore the world of ideas?

He expects computers "to extend their range of use and application much more rapidly in the area of human white collar and executive work than in the area of blue collar work. Both are going to expand, but expansion in the former will be much more rapid. One of the big lessons of the 27-year history of artificial intelligence has been that it is much easier to automate a college professor or a businessman than it is to automate a bulldozer operator.

"The boundaries are moving faster with respect to computers doing those kinds of things done inside the central nervous system—the thinking kinds of things, the problem-solving things, the use of information banks in relation to intelligence—than with respect to physical robotics."

Simon discussed several aspects of robotics and then threw the presentation open to questions from the audience. These covered a wide range of topics from the Japanese research effort (no threat in Simon's opinion) to the Turing test (he feels that Ken Colby's simulated paranoid program essentially passed the test) to the emotional content of thinking (go slow if your decision-making has high emotional

---

***Bacon has  
re-invented the concept  
of inertial mass.***

---

content). However, Simon's answer to one question pretty much sums up his views about computers and AI.

Question: Are there any criteria today that we could use to conclude that computers can't think?

Answer: "I can't think of any; maybe a computer could. I really find no reason to regard myself as thinking in ways different than a computer can think. Fortunately it doesn't bother me, so I don't lose any sleep over it." □

# DYNACOMP

*The Leading Distributor Of  
Microcomputer Software*

**PRESENTS**

APPLE™  
ATARI™  
CANON AS-100™  
COMPUSTAR™  
HEATH/  
ZENITH Z-100™  
IBM-PC™  
KAYPRO II™  
MORROW  
DESIGN™  
NEC™  
NORTHSTAR™  
OSBORNE™  
PET/CBM™  
SUPERBRAIN™  
TRS-80™  
CP/M DISKS  
DISKETTES

## HOME FINANCE

PERSONAL FINANCE SYSTEM (ALL)	\$ 39.95
TAX OPTIMIZER (ALL)	\$ 59.95
MICROCOMPUTER STOCKS (ALL)	\$ 59.95
MICROCOMPUTER BONDS (ALL)	\$ 59.95
BUDGET MODEL ANALYZER (ATARI)	\$ 23.95
PERSONAL BALANCE SHEET (OSBORNE)	\$ 29.95
STOCK MASTER/STOCK PLOT (APPLE)	\$ 59.95
NYINDEX (ATARI)	\$ 29.95
STOCKAID (ATARI)	\$ 29.95
PORTFOLIO MANAGEMENT (APPLE/OSB)	\$ 69.95
INVESTING ADVISOR (TRS)	\$ 39.95
INVESTMENT MANAGEMENT (ATARI/IBM)	\$ 49.95
OPTIONS ANALYSIS (TRS/OSB/APPLE)	\$ 99.95

## BUSINESS

FINANCIAL MANAGEMENT (NORTH STAR)	\$149.95
MAIL MASTER (ATARI)	\$ 39.95
PAYFIVE (APPLE)	\$149.95
LIFE CYCLE ANALYSIS (APPLE)	\$ 39.95
DATA RETRIEVAL SYSTEM (ATARI/CPM)	\$ 29.95
OPTIMAC (TRS/APPLE)	\$ 43.95
BOOKKEEP (CPM)	\$ 69.95
CUSTOMER PROFILE (OSBORNE)	\$ 59.95

## EDUCATION

HODGE PODGE (APPLE/TRS)	\$ 18.95
CHILDREN'S CARROUSEL (APPLE)	\$ 19.95
TEACHER'S AIDE (ALL)	\$ 17.95
TEACHER'S GRADE BOOK (APPLE)	\$ 49.95
PLAYER PIANO (ATARI)	\$ 19.95
SPELL IT (APPLE)	\$ 19.95
ELIZA II (ALL except APPLE)	\$ 19.95
PROBABILITY (APPLE/ATARI)	\$ 39.95
TYPMASTER (TRS)	\$ 18.95
FEELING BETTER (APPLE)	\$ 39.95
FROGMASER (ATARI)	\$ 21.95

## DISKETTES

5 1/4" SS/SD with hub rings, packed in plastic storage box (10/box)	\$ 19.95
--	----------

PRICES ABOVE ARE FOR 5 1/4" SINGLE DENSITY. ADD \$3.00 FOR DOUBLE DENSITY, \$2.50 for 8"

## CARD GAMES

BRIDGE MASTER (ALL)	\$ 29.95
GIN RUMMY (APPLE)	\$ 22.95
POKER PARTY (ALL)	\$ 23.95
BLACKJACK COACH (ALL)	\$ 33.95
EUCHRE (ATARI)	\$ 19.95

## WAR GAMES

LEIPZIG 1813 (ATARI)	\$ 33.95
SHILOH 1862 (ATARI)	\$ 33.95
IRONCLADS (CPM)	\$ 29.95

## ADVENTURE

CRANSTON MANOR (CPM)	\$ 19.95
WINDMERE ESTATE (NORTH STAR/APPLE)	\$ 29.95
ZODIAC CASTLE (NORTH STAR/APPLE)	\$ 29.95
STARSHIP LANDING PARTY (TRS)	\$ 19.95
GENESIS-THE CREATOR (APPLE)	\$ 49.95
VALLEY OF THE KINGS (ATARI)	\$ 29.95

## GAMES

VALDEZ (ALL)	\$ 23.95
FLIGHT SIMULATOR (ALL)	\$ 23.95
BACKGAMMON 2.0 (ALL)	\$ 23.95
MANAGEMENT SIMULATOR (ALL)	\$ 29.95
CHESS MASTER (CPM/TRS)	\$ 23.95
STARBASE 3.2 (ALL)	\$ 17.95
CACTUS LEAGUE BASEBALL (ATARI)	\$ 19.95
FINAL ASSEMBLY (ATARI)	\$ 19.95

## ENGINEERING/STATISTICS

DIGITAL FILTER (ALL)	\$ 53.95
HARMONIC ANALYZER (ALL)	\$ 33.95
BASIC SCIENTIFIC SUBS. Vol. 1 (ALL)	\$ 53.95
BASIC SCIENTIFIC SUBS. Vol. 2 (ALL)	\$129.95
BASIC STATISTICAL SUBS. (ALL)	\$ 99.95
CELESTIAL BASIC (APPLE)	\$ 49.95
ACTIVE CIRCUIT ANALYSIS (ALL)	\$ 43.95
BEAM DEFLECTION (ALL)	\$ 39.95
ANALYSIS OF VARIANCE (ALL)	\$ 43.95
PRINCIPAL COMPONENTS (APPLE)	\$ 49.95
STATTEST (ALL)	\$ 33.95

## THESE ARE ONLY A FEW OF THE HUNDREDS OF PROGRAMS IN THE DYNACOMP LIBRARY.

Besides being the leading distributor of microcomputer software, **DYNACOMP** currently distributes software in over 60 countries. **DYNACOMP** provides **FRIENDLY, ACCESSIBLE CUSTOMER SERVICE** through our highly qualified and knowledgeable staff. **WE'RE AS NEAR AS YOUR TELEPHONE.**

**DYNACOMP'S** prices are highly competitive and we promise prompt processing of every order!

## WRITE FOR A FREE, DETAILED CATALOG

Daytime  
Toll Free Order Phones: (800) 828-6772 (800) 828-6773  
24 Hour  
Message and Order Phone: (716) 442-8731

Office Hotline:  
9-5 E.S.T.  
(716) 442-8960

## DYNACOMP, INC.

1427 Monroe Avenue • Rochester, NY 14618

CIRCLE 281 ON READER SERVICE CARD

# computer mail order

## PRINTERS SMITH CORONA

Call on \$50.00 Factory Rebate!  
TP-1 ..... \$499.00  
Tractor Feed ..... \$129.00  
Ultrasonic I Typewriter ..... \$439.00

## C. ITOH (TEC)

Gorilla ..... \$209.00  
Prowriter 8510P ..... \$379.00  
Prowriter 8510S ..... \$579.00  
Prowriter II-P ..... \$699.00  
Prowriter II-S ..... \$749.00  
Starwriter F10-40 ..... \$1259.00  
Printmaster F10-55 ..... \$1649.00

## OKIDATA

Call for price and information of  
OKIDATA 82A, 83A, 84(Parallel),  
84(Serial), 92 & 93.

## EPSON

Call for price and information on EPSON  
RX80, MX80, MX80FT, FX80 & MX100.

## IDS

MicroPrism ..... \$649.00  
132 (Fully Configured) ..... \$1599.00  
80 (Fully Configured) ..... \$1399.00  
Call for other configurations.

## STAR

Gemini 10 ..... \$339.00  
Gemini 15 ..... \$489.00  
Serial Board ..... \$75.00

## DAISYWRITER

2000 (Letter Quality) ..... \$1149.00  
Tractor Feed ..... \$109.00

## DIABLO

620 ..... \$999.00  
630 ..... \$1769.00

## TeleVideo



## TERMINALS

910 ..... \$559.00  
912C ..... \$689.00  
920C ..... \$739.00  
925C ..... \$719.00  
950 ..... \$929.00

## COMPUTERS

800A ..... \$1259.00  
802 ..... \$2649.00  
802H ..... \$4695.00  
806/20 ..... \$4949.00  
816/40 ..... \$8999.00  
803 ..... \$1949.00  
1602G ..... \$3399.00  
1603 ..... CALL

## NEC

### COMPUTERS

6000 ..... CALL  
8001A ..... \$669.00  
8031 ..... \$669.00  
8012 ..... \$549.00  
8801 ..... CALL

### PRINTERS

8023 ..... \$419.00  
7710/7730 ..... \$2249.00  
3510/3530 ..... \$1549.00

### MONITORS

JB-1260 ..... \$119.00  
JB-1201 ..... \$149.00  
JC-1212 ..... \$299.00  
JC-12-202 ..... \$299.00  
JC-1203 ..... \$549.00

## EAGLE



Call on Eagle 8 Bit & 16 Bit  
Computers & Software

### MODEMS

#### HAYES

Smart ..... \$219.00  
Smart 1200 (1200 Baud) ..... \$519.00  
Chronograph ..... \$199.00  
Micromodem 100 ..... \$309.00  
Micromodem II ..... \$279.00  
Micromodem II (with term) ..... \$299.00  
Smart Com II ..... \$99.00  
Smart 1200B ..... CALL

#### NOVATION

J-Cat ..... \$119.00  
Cat ..... \$144.00  
D-Cat ..... \$159.00  
103 Smart Cat ..... \$189.00  
Apple Cat II ..... \$279.00  
103/212 Smart Cat ..... \$439.00  
212 Apple Cat II ..... \$609.00  
Apple Cat II 212 Upgrade ..... \$309.00

#### ANCHOR

Mark I (RS-232) ..... \$79.00  
Mark II (Atari) ..... \$79.00  
Mark III (T.J.-99) ..... \$109.00  
Mark IV (CBM-PET) ..... \$125.00  
Mark V (Osborne) ..... \$95.00  
Mark VI (IBM-PC) ..... \$179.00  
Mark VII (Auto Ans./Auto Dial) ..... \$99.00  
TRS-80 Color Computer ..... \$99.00  
9 Volt Power Supply ..... \$9.00  
Mark VIII ..... CALL

### MONITORS

#### AMDEK

300G ..... \$159.00  
300A ..... \$169.00  
310A ..... \$169.00  
Color I ..... \$279.00  
Color I plus ..... \$299.00  
Color II ..... \$439.00  
Color III ..... \$349.00

#### BMC

12AU 12" Green ..... \$79.99  
1401 13" Color (Mid-Res) ..... \$369.00  
9191 U 13" Composite ..... \$329.00

#### TAXAN

RGB 1 (Hi-Res) ..... \$299.00  
RGB III ..... \$499.00  
12 N Green ..... \$119.00  
12 A Amber ..... \$125.00

#### ZENITH

ZVM 121 ..... \$95.00  
ZT-1 Terminal ..... \$369.00

#### U.S.I.

Pi 1, 9" Green ..... \$99.00  
Pi 2, 12" Green ..... \$119.00  
Pi 3, 12" Amber ..... \$159.00  
Pi 4, 9" Amber ..... \$139.00  
1400C 14" Color ..... \$299.00

### PANASONIC

JR200U 32K Pers. Computer ..... \$309.00

### MONITORS

TR-120 12" Hi-Res Green ..... \$159.00  
CT-160 10" Dual Mode Color ..... \$299.00  
DT-D1000 10" RGB ..... \$349.00  
DT-D1300 13" RGB/Compos. .... \$429.00

## IBM

### NEC

3550 PRINTER... \$1949

### PERCOM/TANDOM DRIVES

5 1/4" 160K Disk Drive ..... \$249.00  
5 1/4" 320K Disk Drive ..... \$299.00

### AMDEK

310A Amber Monitor ..... \$169.00  
Amdisk III (3" Drive) ..... \$499.00  
DXY Plotter ..... \$599.00  
Color II ..... \$439.00

### AST

Mega Plus 64 ..... \$399.00

### GUBIE

PC Keyboard ..... \$219.00

### SOFTWARE

MicroPro WordStar/MailMerge ..... \$319.00  
I.U.S. Easywriter II ..... \$249.00  
I.U.S. Easywriter ..... \$129.00  
Peach Package (GL/AP/AR) ..... \$419.00

### PROFESSIONAL

#### SOFTWARE

PC Plus/Word Processing ..... \$319.00

#### CONTINENTAL

#### SOFTWARE

1st Class Mail/Form Letter ..... \$89.00  
The Home Accountant Plus ..... \$109.00

### SYNAPSE

File Manager ..... \$119.00

PFS	APPLE	IBM
File	\$89.00	\$99.00
Report	\$89.00	\$89.00
Graph	\$89.00	\$99.00
Write	n/a	\$99.00

### READY FC RMS

1" or 2" Address Labels (Tract. Feed) ..... \$9.95  
15" Report Paper (Tract. Feed) ..... \$24.95  
8 1/2" Blink Wht Paper (Tract. Feed) ..... \$19.95  
8 1/2" Blink Env (Tract. Feed) ..... \$14.95

### SANYO

MB1000 Computer ..... \$1599.00  
INCLUDES FREE SOFTWARE!  
MicroPro, WordStar, Calcstar,  
Mail Merge & Report Star  
MB 160 Add on Drive ..... \$539.00  
5500 Letter Quality Printer ..... \$699.00

## TIMEX SINCLAIR 1000



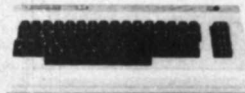
\$39.95

16K Memory Module ..... \$44.95  
Vu-Calc ..... \$17.95  
Check Book Manager ..... \$13.95  
The Organizer ..... \$14.95  
The Budgeter ..... \$13.95  
Stock Option ..... \$14.95  
Loan & Mortgage Amortizer ..... \$12.95  
Mindware Printer ..... \$109.00

### ORSBYTE SOFTWARE

Graphics ..... \$12.99  
Home Budgeter ..... \$12.99  
Home Inventory ..... \$12.99  
Income Tax ..... \$14.99  
Mega Mind ..... \$15.99  
Salvo ..... \$12.99  
The Quiz ..... \$12.99  
Words ..... \$12.99

## commodore



**CBM 64  
\$369**

**VIC 20  
\$99.**

**8032..... \$599.00**

**64K Upgrade Kit ... \$269.00**

**8086 ..... \$849.00**

**9000 ..... \$999.00**

**8-128 ..... \$769.00**

**8-256 ..... \$989.00**

**4032 ..... \$599.00**

**4064 ..... \$569.00**

**2031 ..... \$299.00**

**8050 ..... \$949.00**

**8250 ..... \$1199.00**

**9060 (5 Meg. HD) ..... \$1999.00**

**9080 (7.5 Meg HD) ..... \$2199.00**

**4023 ..... \$379.00**

**8023 ..... \$569.00**

**6400 Let Qual. Print. .... \$1399.00**

**Spell Master ..... \$149.00**

**22Ram addCP/M 864K ..... \$549.00**

**Silicon Office ..... \$749.00**

**Calc Result ..... \$159.00**

**The Manager ..... \$209.00**

**The Soft Rom ..... \$129.00**

**Jinsam 800C/64 ..... CALL**

**ADA1600CBM to Parl.Int. .... \$89.00**

**ADA1450 CBM to Ser. Int. .... \$99.00**

### PROFESSIONAL SOFTWARE

Power ..... \$79.00

Info Pro ..... \$199.00

Word Pro 2 Plus ..... \$159.00

Word Pro 3 Plus ..... \$199.00

Word Pro 4 Plus ..... \$299.00

Word Pro 5 Plus ..... \$299.00

Administrator ..... \$379.00

Word Pro 64 ..... \$69.95

Spell Checker ..... CALL

### CARDCO

#### VIC 20/CBM 64

Light Pen ..... \$32.00

Cassette Interface ..... \$29.00

Parallel Printer Interface ..... \$64.00

3Slot Expans.Interface(20 only) ..... \$32.00

6Slot Expans.Interface(20only) ..... \$79.00

### HES

Shamus (ROM) ..... \$29.00

Protector (ROM) ..... \$32.00

Robot Panic (ROM) ..... \$29.00

Pirates (ROM) ..... \$29.00

HES Writer (ROM) ..... \$29.00

Call on our Large Selection of  
VIC 20 & C-64 Software, such as:  
**EPYX, Microspec, Quick Brown Fox and  
Kansas City Software.**



### PC-1500

### POCKET COMPUTER

**\$169.**

**PC1250... \$89.00**



CE150 Printer, Plotter and  
Cassette Interface Unit ..... \$172.00  
CE152 Cassette Recorder ..... \$62.00  
CE155 8K Ram Expans. Mod. .... \$94.00  
CE125 Printer/Micro Cass ..... \$129.00  
Statistics Pack ..... \$49.00

## computer mail order east



# 800-233-8950

In PA call (717)327-9575, Dept.808, 477 E. 3rd St., Williamsport, PA 17701

**INTERNATIONAL ORDERS:** All shipments outside the Continental United States must be pre-paid by certified check only. Include 3% (minimum \$3.00) shipping and handling. **EDUCATIONAL DISCOUNTS:** Additional discounts are available from both Computer Mail Order locations to qualified Educational Institutions. **APD & FPO:** Add minimum \$5.00 shipping and handling.

# computer mail order

**FRANKLIN**



Call for price and information  
on the NEW FRANKLIN  
Computers!

Disk Drives, Software and  
System Specials  
ALSO AVAILABLE!

## MICRO-SCI DISK DRIVES FOR APPLE & FRANKLIN

A2 .....	\$269.00
A40 .....	\$349.00
A70 .....	\$459.00
C2 Controller .....	\$79.00
C47 Controller .....	\$89.00

## RANA DISK DRIVES

Elite 1 plus (Apple/Franklin) ... CALL

1000 (Atari) ... CALL

## AMDEK DISK DRIVES

Amdisk I, 3" Mini Disk for  
Apple II & IIe ... \$229.00

## SYSKOM

48K Color Computer  
APPLE COMPATIBLE  
**\$599.**

## VISICORP

for Apple, IBM & Franklin	
Visidex .....	\$189.00
Visifile .....	\$189.00
Visiplot .....	\$159.00
Visiterm .....	\$69.00
Visitrend/Plot .....	\$229.00
Visischedule .....	\$229.00
Desktop Plan .....	\$189.00
Visicalc (Apple II, CBM, IBM) .....	\$179.00

Visicorp prices for IBM may vary slightly

## BRODERBUND

Apple Panic .....	\$23.00
David's Magic .....	\$27.00
Star Blazer .....	\$25.00
Arcade Machine .....	\$34.00
Chopflifter .....	\$27.00
Serpentine .....	\$27.00

## INFOCOM

Deadline (AP, IBM, AT & C-64) .....	\$35.00
Star Cross .....	\$29.00
Zork I, II or III .....	\$29.00

## MPC

Bubdisk (128K Non Volatile) .....	\$649.00
-----------------------------------	----------

## AXLON

Apple/Franklin 128K Ram .....	\$299.00
Apple/Franklin Ram Disk .....	\$729.00

## KRAFT

Apple Joystick .....	\$44.00
----------------------	---------

## CONTINENTAL

## SOFTWARE

Tax Advantage (Apple/Atari) .....	\$45.00
Home Acct. (Apple/Atari) .....	\$59.00
1st Cl. Mail/Form Letter (Apple) .....	\$79.00
The Book of Apple .....	\$14.95
The Book of Atari .....	\$14.95
The Book of Apple Graphics .....	\$14.95

**PERCOM**

## DISK DRIVES FOR ATARI

AT88-S1 .....	\$399.00
AT88-A1 .....	\$299.00
AT88-S2 .....	\$649.00
RFD 40-S1 .....	\$549.00
RFD 40-A1 .....	\$349.00
RFD 40-S2 .....	\$889.00
RFD 44-S1 .....	\$679.00
RFD 44-S2 .....	\$999.00

## FLOPPY DISKS

### MAXELL

MD I (Box of 10) .....	\$32.00
MD II (Box of 10) .....	\$44.00
FD I (8") .....	\$40.00
FD II (8") .....	\$50.00

### VERBATUM

5 1/4" SS DD .....	\$26.00
5 1/4" DS DD .....	\$36.00

### ELEPHANT

5 1/4" SS DD .....	\$18.99
5 1/4" SS DD .....	\$24.99
5 1/4" DS DD .....	\$29.99

### HEAD

Disk Head Cleaner .....	\$14.95
-------------------------	---------

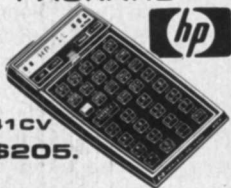
## SIRIUS

Bandits (Apple) .....	\$28.00
Beer Run (Apple) .....	\$24.00
Free Fall (Apple) .....	\$24.00
Sneakers (Apple) .....	\$24.00
Snake Byte (Apple) .....	\$24.00
Fast Eddie (Atari) .....	\$21.00
Turmoil (Atari) .....	\$21.00
Deadly Duck (VIC) .....	\$21.00

## INTERFACES & ACCESSORIES

80 Column Apple Card .....	\$159.00
Apple Paral. Printer Interface .....	\$69.00
Atari 850 to Paral. Printer Cable .....	\$29.00
RS232C-RS232C Cables .....	\$29.00
Centronics Paral.-Paral. Cables .....	\$29.00
Call on IBM, Osborne, Daisywriter, Atari, Commodore, Apple and Franklin Interface Cards, Cables and Accessories.	

**HEWLETT  
PACKARD**



**41CV  
\$205.**

## HP75... \$749.

HP 41C .....	\$146.00
HP 10C .....	\$52.00
HP 11C .....	\$69.00
HP 12C .....	\$90.00
HP 15C .....	\$90.00
HP 16C .....	\$90.00

For HP41/41CV

HPIL Module .....	\$99.00
HPIL Cassette or Printer .....	\$359.00
Card Reader .....	\$144.00
Extended Functions Module .....	\$64.00
Time Module .....	\$64.00
Mathematics Pac .....	\$26.50
Real Estate Pac .....	\$40.00



## HOME COMPUTERS

## 400-16K ..... \$99.

Our Price \$149.00, Get \$50.00 rebate direct from Atari!  
**600XL-16K ..... \$149.**

## 800-48K ..... \$389.

Our Price \$489.00, Get \$100.00 rebate direct from Atari!  
**1200-64K ..... \$449.**

Our Price \$549.00, Get \$100.00 rebate from Atari!

810 Disk Drive .....	\$419.00
Inhome Keyboard/Atari 400 .....	\$39.00
1010 Program Recorder .....	\$74.00
1020 40 Column Print/Plot .....	\$269.00
1025 80 Column Printer .....	\$469.00
1027 Letter Quality Printer .....	\$299.00
1050 Double Density Drive .....	\$379.00
830 Acoustic Modem .....	\$159.00
850 Interface Module .....	\$169.00
CX40 Pair Joysticks .....	\$16.00
CX418 Home Manager Kit .....	\$69.00
CX419 Bookkeeper Kit .....	\$195.00
CX482 Educator Kit .....	\$129.00
CX483 Programmer Kit .....	\$54.00
CX488 Communicator Kit .....	\$229.00
CX7101 Entertainer Kit .....	\$69.00
Invitation to Programming I .....	\$18.00
Invitation to Programming II .....	\$20.00
Invitation to Programming III .....	\$20.00
4002 Basic Language .....	\$42.00
4003 Assembler Editor .....	\$47.00
8121 Micro Assembler .....	\$69.00
8126 Micro Soft .....	\$69.00
405 Pilot (Edu.) .....	\$105.00
4018 Pilot (Home) .....	\$72.00
8036 Atari Writer .....	\$79.00
404 Word Processor .....	\$119.00
5059 Visicalc .....	\$159.00

## ATARI

Pacman .....	\$33.00
Centipede .....	\$33.00
Defender .....	\$33.00
Galaxian .....	\$33.00
Missile Command .....	\$29.00
Star Raiders .....	\$33.00
Caverns of Mars .....	\$32.00
Dig Dug .....	\$33.00
Donkey Kong .....	CALL
E.T. Phone Home .....	\$39.00
Eastern Front (1941) .....	\$39.00
QIX .....	\$33.00
Superman III .....	\$39.00
Star Truk .....	\$33.00
Asteroids .....	\$29.00
Basketball .....	\$29.00
Computer Chess .....	\$29.00
Juggles House .....	\$23.00
My First Alphabet .....	\$29.00

## APX

Text Formatter .....	\$18.50
Family Budgeter .....	\$18.50
Eastern Front .....	\$24.00
Family Cash .....	\$18.50
Jukebox .....	\$13.50
Downhill .....	\$18.50
Outlaw .....	\$18.50
Holy Grail .....	\$24.00
Player Piano .....	\$18.50
Keyboard Organ .....	\$18.50
Number Blast .....	\$13.50
Progmater .....	\$18.50
747 Land Simulator .....	\$18.50
Bumper Pool .....	\$13.50

## ON-LINE

Jawbreaker .....	\$27.00
Softporn .....	\$27.00
Wizard and Princess .....	\$29.00
The Next Step .....	\$34.00
Mission Asteroid .....	\$22.00
Mouskattack .....	\$31.00
Frogger .....	\$31.00
Cross Fire (ROM) .....	\$36.00
Some ON-LINE Products are also available for Apple & IBM.	

Call for information!

## SYNAPSE

File Manager 800 plus .....	\$69.00
Chicken (ROM) .....	\$34.00
Picnic Paranoia (ROM) .....	\$34.00
Claim Jumper (ROM) .....	\$34.00
Slime (ROM) .....	\$34.00
Shamus (ROM) .....	\$34.00
Protector (ROM) .....	\$34.00
Dodge Racer (C/D) .....	\$26.00
Nautilus (C/D) .....	\$26.00
Shadow World (C/D) .....	\$26.00
Survivor (C/D) .....	\$26.00
Drebs (C/D) .....	\$26.00
Necromancer (C/D) .....	\$26.00
Pharaoh's Curse (C/D) .....	\$26.00
Fort Apocalypse (C/D) .....	\$26.00
Assembler .....	\$30.00

## DATASOFT

Pacific Coast Highway .....	\$25.00
Canyon Climber .....	\$25.00
Tumble Bugs .....	\$19.00
Shooting Arcade .....	\$19.00
Clowns and Balloons .....	\$25.00
Graphic Master .....	\$30.00
Graphic Generator .....	\$13.00
Micro Painter .....	\$25.00
Text Wizard .....	\$59.00
Spell Wizard .....	\$39.00
Bishop's Square .....	\$25.00
Sands of Egypt .....	\$25.00
Moon Shuttle .....	\$25.00
Zaxxon .....	\$29.00
Basic Compiler .....	\$59.00

## ALIEN

Atari Voice Box .....	\$119.00
Apple Voice Box .....	\$149.00

## MEMORY

Axlon 32K Ram .....	\$65.00
Axlon 48K Ram .....	\$109.00
Axlon 128K Ram .....	\$299.00
Intec 32K Board .....	\$74.00
Intec 48K Board .....	\$99.00
Intec 64K Board (400 only) .....	\$149.00

## JOYSTICKS

Wico Joystick .....	\$24.95
Famous Red Ball .....	\$26.95
Apple Trackball .....	\$59.00
Atari/VIC Trackball .....	\$55.00
Apple Adaptor .....	\$16.00



## ATARI 400 VERSIONS

32K... \$174.*
48K... \$199.*
64K... \$259.*

\*Non-Atari Ram

## CBS

Krazy Shoot Out .....	\$29.00
Krazy Kritters .....	\$29.00
Krazy Antics .....	\$29.00
K-star Patrol .....	\$29.00
Stick Stand .....	\$3.99

## EPYX

Crush, Crumble & Chomp .....	\$24.00
Crypt of the Undead .....	\$24.00
Curse of Ra .....	\$16.00
Dalestones & Ryn .....	\$16.00
Invasion Orion .....	\$19.00
King Arthur's Hair .....	\$24.00
Morloc's Tower .....	\$16.00
Rescue at Rigel .....	\$24.00
Ricochet .....	\$16.00
Star Warrior .....	\$29.00
Temple of Apsal .....	\$29.00
Upper Reaches of Apsal .....	\$16.00

## SPINNAKER

Snooper Troops # 1 .....	\$34.00
Snooper Troops # 2 .....	\$34.00
Face Maker .....	\$24.00
Story Machine .....	\$24.00
Delta Drawing .....	\$45.00
Rhymes and Riddles .....	\$21.00
Kindercomp .....	\$21.00

## ROKLAN

Wizard of War (ROM) .....	\$34.00
Deluxe Invader (ROM) .....	\$29.00
Gorf (ROM) .....	\$34.00

## FIRST STAR

Astro Chase .....	\$25.00
-------------------	---------

## SIG 5

Miner 49er .....	\$35.00
------------------	---------

## GAMESTAR

Baja Buggies .....	\$24.95
Football .....	\$24.95

## BUDGECO

Raster Blaster .....	\$24.95
----------------------	---------

## L.J.K.

Letter Perfect 40/80 Col. Disk .....	\$109.00
Letter Perfect 40 Col. ROM .....	\$179.00
Letter Perfect 80 Col. ROM .....	\$179.00
Data Perfect 40/80 Col. Disk .....	\$99.00
Mail Merge .....	\$21.95

CALL FOR APPLE/LJK PRODUCTS

## BIT 3

80 Col. Card for Atari 800 .....	\$249.00
----------------------------------	----------

## INTEC

Real Time Clock .....	\$39.00
-----------------------	---------

We also stock software by:  
Adventure International,  
Eduware, Creative Software,  
Dorsett Educational,  
IDSI, Romox and Artworx.  
Call for details and prices

## computer mail order west

**800-648-3311**



In NV call (702)588-5654, Dept. 808, P.O. Box 6689, Stateline, NV 89449

No risk, no deposit on C.O.D. orders. Pre-paid orders receive free shipping within the UPS Continental United States with no waiting period for certified checks or money orders. Add 3% (minimum \$3.00) shipping and handling on all C.O.D. and credit card orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. **NOTE:** We stock manufacturer's and third party software for most all computers on the market. Call today for our new catalog.

CIRCLE 129 ON READER SERVICE CARD

computer mail order east

# Profile Of The Creative Individual



*The following is the first of a two-part article on the creative individual.*

The creative individual possesses many distinct attributes or characteristics by which he can be identified and that significantly differentiate him from those who are less creative or even noncreative.

Before describing those attributes in detail, it should be pointed out that no one individual could hope to possess all of these in a uniformly high degree. Rather, the descriptions should be taken as a composite profile of the "ideal" creative individual. There are many gradations in the attributes and skills creative people possess. But all of them have at least some of these attributes in common to earn the appellation "creative." Also, certain assemblies or combinations of ideational dexterity frequently compensate for many attributes that are less developed or have fallen into disuse.

Another thing that must be pointed out is that no attempt will be made in this article to divide or classify these attributes into the customary cognitive, affective, and conative groupings. The reason for this is that the attributes of creativity are not self-contained units,

## Eugene Raudsepp

but overlap and merge into one another, partaking of the affective, the cognitive, and the conative. It would be idle and meaningless to attempt to draw sharp lines between them.

We can not divide personality into characteristics the way we can slice bread into so many pieces. The slices of bread add up to the complete loaf, but a collection of personality characteristics does not add up to a complete personality. It is only to facilitate analysis and

***The creative person  
has the ability  
to find unity in  
diversity—to see  
unexpected  
relationships.***

description that the characteristics are treated here as discrete entities.

What is the value of gaining an insight into these attributes? Because we learn

by imitation, we can substantially increase our creative capacities and performance by deliberately cultivating those characteristics we feel we lack at present or that need some "dusting off."

### Sensitivity To Problems

Philosopher John Dewey was one of the first to note that creativity does not start with facts, theories, or hypotheses, but with a *problematic situation*. He felt that sensitivity and the ability to envisage and formulate the right problem are crucial to effective problem solving.

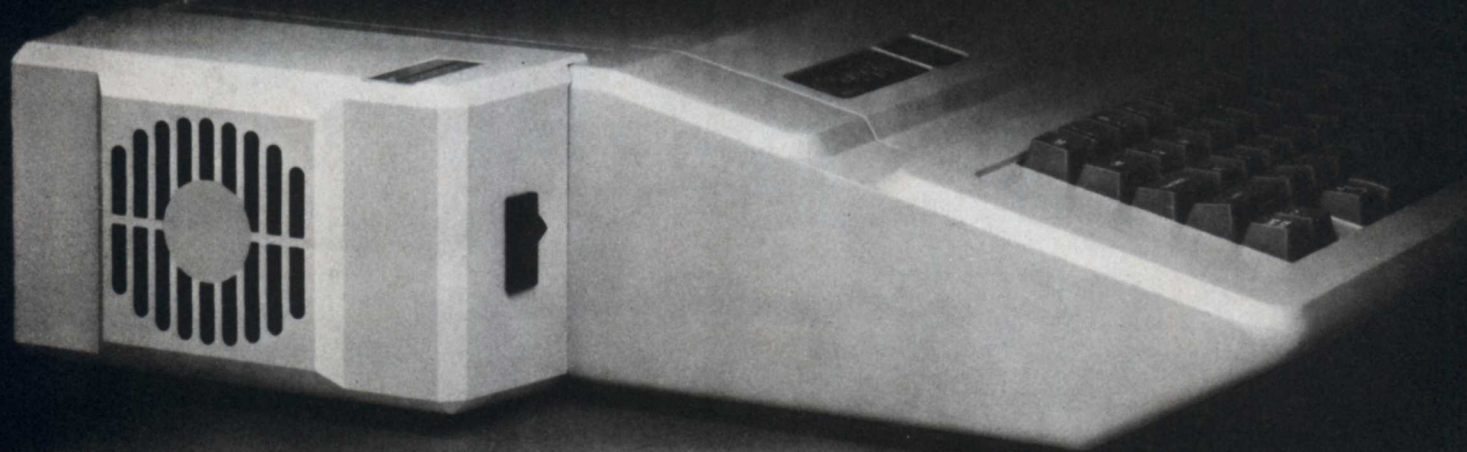
The creative person has keen powers of observation and an unusual ability to perceive and notice problems, situations, and challenges that have escaped the attention of others. This is because of his greater sensitivity to the unusual, the odd, or the promising aspects of situations—the hidden opportunities often overlooked by less creative individuals.

The exceptional, incongruous, paradoxical, and unusual happenings and situations that he sees snap him instantly to attention and are grist for his mill. Because of his questioning approach to almost everything he encounters, he doesn't take the obvious for granted. Rather, he deliberately places his problems in new and different perspectives to approach solutions from unique vantage points.

Added to his capacity to note and

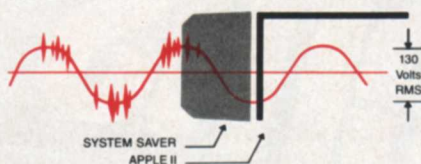
# System Saver™

The most important peripheral for your Apple II and IIe.



## For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

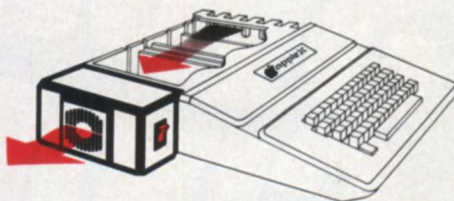


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise signals by a minimum of 30 dB from 600 khz to 20 mhz, with a maximum attenuation of 50 dB.

## For Cooling

As soon as you add 80 columns or more memory to your Apple II you need SYSTEM SAVER.

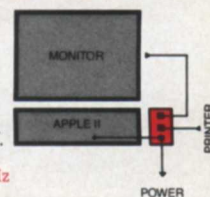
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.



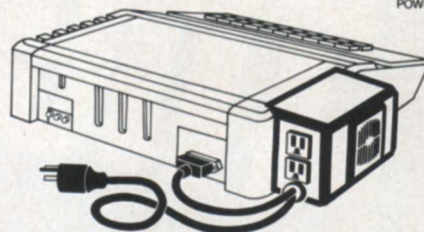
SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

## For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer.



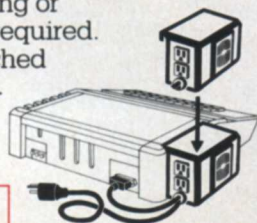
Available in 220/240 Volt, 50 Hz



The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!

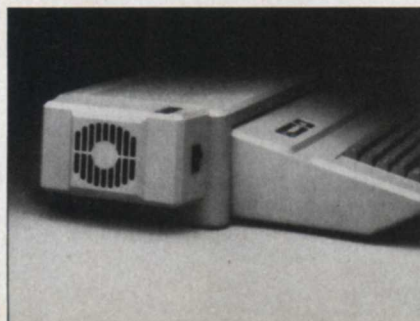
## Easy Installation

Just clips on.  
No mounting or hardware required.  
Color matched to Apple II.



PATENT PENDING

## Compatible with Apple Stand



**\$89.95 at your local dealer or order direct by phone or mail.**

For phone or mail orders include \$2.50 for handling. New York State residents add sales tax. VISA and MASTERCARD accepted. Dealer inquiries invited.

Kensington Microware Ltd.  
919 Third Avenue, New York NY 10022  
(212) 486-7707 Telex: 236200 KEN UR



CIRCLE 203 ON READER SERVICE CARD

Whether you're in the market  
for new software or need assistance  
with existing software, there is  
only one number to call:

# 1-800-237-8977

In Florida call 1-813-786-1259

Business Applications Software with  
**TOTAL SUPPORT**...specializing in:  
**IBM<sup>TM</sup>, APPLE<sup>TM</sup>, TRS-80<sup>TM</sup> and XEROX<sup>TM</sup>**

# The Systems Group

2340 State Route 580/Suite 234  
Clearwater, Florida 33575  
Telex 701484

There is only one catalog to have:  
our new, **free** 100 pages of the  
best in hardware and software.  
Send for your copy today!

IBM is a trademark of IBM Corporation  
APPLE is a trademark of Apple Computer Inc.  
TRS-80 is a trademark of The Radio Shack Division of Tandy Corporation  
XEROX is a trademark of Xerox Corporation

**CIRCLE 216 ON READER SERVICE CARD**

## Creativity, continued...

arrest the unusual or different, to see gaps and unrealized potentials in situations, is his equally well developed ability to see resemblances, similarities, and analogies among a multitude of different experiences.

Perhaps because of the creative person's greater sensitivity to self, to others, and to sensory stimuli from the outside world, he tends to be dissatisfied with things as they are and eager to improve upon them. Hence, he is constantly either seeking or finding challenging problems to solve.

He is like the proverbial Socratic philosopher with a "thorn in his flesh," in that he is perpetually disturbed by something. For him there is hardly a situation entirely free of problems, but this does not cause him frustration and worry. On the contrary, he welcomes the challenge of problems and the state of "happy" dissatisfaction with the status quo. He knows that creativity grows, as

## The creative person is flexible in his thinking.

the poet A. E. Houseman speculated, out of irritation, like a pearl created from a friction-generating particle of sand in an oyster shell.

### Fluency

In addition to sensitivity, there are two other attributes vital for creative problem solving: *fluency* and *flexibility*.

The creative individual has the ability to generate a large number of ideas when confronting a problem or seeking improvements. He can scan more alternative thoughts, ride the wave of dif-

ferent associative currents, and think of more ideas in a given span of time than can people who are less creative. Capable of tapping his tropical imagination and producing ideas in volume, he stands a good chance of selecting and developing significant ideas.

Fluency can be demonstrated by a simple test first developed by psychologist J. P. Guilford. One can ask people to list as many uses as they can think of for some common object, such as, for example, a red brick. If the person lists a large number of uses all in one class or category, such as construction or adornment, he shows fluency. If he, in addition, lists uses that range over several categories (there are more than sixteen such categories in the case of the red brick), he shows that he also has flexibility.

It must be pointed out that fluency of ideas and spontaneous expressiveness can be considerably enhanced if one



If you own a printer you recognize the problem: Where to store the paper so it can properly feed into the printer. On the floor the paper is difficult to reach, is vulnerable to damage and is susceptible to jams caused by misalignment. Storing the paper behind the printer is equally

frustrating as valuable desk space is wasted.

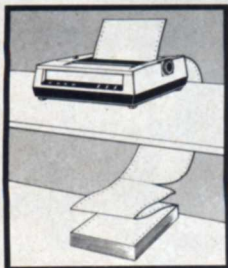
The STANDARD solves the paper feed problem by storing hundreds of sheets in an attractive dispenser directly under the printer. Paper is fed properly, is protected from dirt and dust, and space is saved.

The STANDARD is available in two sizes: *Small* (illustrated), accommodates the Epson MX and FX 80, C. Itoh Prowriter, Apple and IBM Dot Matrix and other similar printers. *Large*, fits wider carriage printers such as the Epson MX 100.

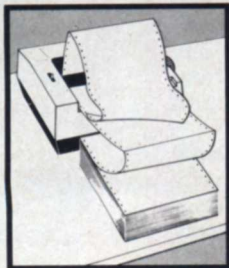
Ask your dealer for the STANDARD or order directly by mail.

# THE STANDARD™ SOLVES THE PAPER FEED PROBLEM!

FLOOR STORAGE



DESK TOP STORAGE



919 Third Avenue • NY, NY 10022  
(212) 486-7707  
Telex: 236200 KEN UR

☐ check enclosed ☐ Visa ☐ Mastercard

Card No. \_\_\_\_\_

Name on Card: \_\_\_\_\_

Expires: \_\_\_\_\_

Please send:

\_\_\_\_\_ The STANDARD(s) small size, 15 1/8" x 13 1/2" \$49.95 each. Total \_\_\_\_\_

\_\_\_\_\_ The STANDARD(s) large size, 23 1/2" x 13 1/2" \$64.95 each. Total \_\_\_\_\_

Please add \$4.00 shipping and handling per unit. NY state residents include sales tax.

Name \_\_\_\_\_

Address (for UPS delivery) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

83CC



learns deliberately to restrain or suppress critical judgment and evaluation of ideas as they occur—until he has marshaled all the ideas he can come up with. An overdeveloped or premature critical attitude during the creative process can inhibit fluency and the forward propulsion of ideas.

Educator Leif Fearn explains fluency this way:

"Fluency is the identification and isolation of knowns. It is rather like rummaging through one's space to make conscious all the possibilities, no matter how remote, that surround a question or problem . . . One characteristic of fluent behavior is its chaining effect by which, given the freedom to brainstorm, some ideas trigger other ideas that might have remained obscure had the production of ideas been limited . . . Fluent behavior has no judgment component because it has nothing to do with 'good,' 'feasible,' or 'appropriate' ideas. It is purely a searching behavior the objective of which is to make conscious as much data as possible."

While there is little doubt that a person who wants to increase his creativity in problem solving should be willing to try a wide variety of "shots in the dark" and list a wealth of notions and ideas, it must not be overlooked that fluency is just the initial stage of the creative process. Fluency must be coupled with, first, the selectivity to choose the more fundamental aspects of the problem to attend to and, second, the ability to identify which of many options is the best for solving the problem. Easy rhetoric and ebullient fantasy unguided by these two factors do not guarantee adeptness in creative problem solving.

#### Flexibility

The creative person is flexible in his thinking. He is able to choose and

explore a wide variety of approaches to his problem without losing sight of his overall goal or purpose. During problem solving, if new developments or changed circumstances demand it, he can easily drop one line of thought or an unworkable approach and take up another. He shows resourcefulness in his ability to shift gears, to discard one frame of reference for another, to change perspective, modify approaches and adapt quickly to new developments or requirements. He constantly asks himself, "What else?" or "What would happen if I viewed the problem from a different angle?"

Scientist James H. Austin distinguishes between two kinds of flexibility: "One is the tendency to shift from one category of meaning to another; the second is loose and unstructured meandering of attention, a readiness to free associate, to daydream,

---

***It is said that  
necessity is the mother  
of invention, but there  
has been a curious  
lack of interest in  
discovering who the  
father is.***

---

to unleash one's thoughts into broad unclassified paths only tangentially related either to the starting point or to each other." Austin feels that this kind of flexibility *correlates* with the rapid production of original ideas.

The associative links between the ideas and idea components the creative person forms during problem solving are loose, fluid, and capable of being dissociated and then reassembled into new patterns. He has no obsessional need to arrive at a closure by prematurely categorizing and structuring any of the elements he conceives. Rather, he prefers to consider, test, and weigh many configurations before choosing the one that will solve his problem. Able to perceive a problem from different viewpoints, he can bombard it with a variety of possible solutions. He is free from what can be termed the "hardening of categories."

Hardening of categories frequently occurs as a result of over-familiarity with an object. As the late professor John E. Arnold of Stanford University put it: "We see a pencil as only a writing instrument, we never see it as a tool for

propping open a window, or as fuel for a fire, or as a means of defending ourselves in an attack. A pencil is a pencil. It is not a combination of graphite, wood, brass and rubber, each of which has multiple properties and multiple uses."

#### Originality

The creative person displays originality in his thinking. Since his thought processes are not clogged with stereotypes, he can reach beyond the ordinary or commonplace to think of unusual, unique solutions to his problems. His originality expresses itself also in his ability to take apart firmly structured and established systems, to dissolve existing syntheses and to use elements and concepts outside of their primary contexts to create new combinations, new systems of relationships.

In addition to this ability to fragment and differentiate, the creative person has the ability to find unity in diversity, to see unexpected relationships and kinships, similarities, likenesses, and connections between things, experiences, and phenomena that to the noncreative person evidence no relationship whatever.

The creative person is always in search of the new, always ready to see something unexpected, novel, and fresh in his experiences. He is receptive to unusual ideas, whether they be his own or others'. In fact, it has been noted that the creative person's open-mindedness sometimes extends to the point of gullibility in accepting bizarre or even crackpot ideas, and that he frequently considers such notions quite seriously before relegating them to the dustbin. New perspectives, new ideas, and venturesome concepts provide an endless source of exercise for his mind.

Originality feeds on change. It is for this reason that many creative



**\$100**

# COMMODORE 64 SOFTWARE COUPON

**\$100**

Expires 10-1-83

## SAVE UP TO \$100

THIS COUPON VERIFIES THAT THE BEARER HAS PURCHASED A ☐ COMMODORE 64 COMPUTER  
☐ DISK DRIVE ☐ PRINTER ☐ MONITOR WHICH QUALIFIES FOR THE PURCHASE OF  
 COMMODORE 64 SOFTWARE FROM THE LIST SHOWN HEREIN AT 1/3 OFF SALE PRICES!!!

THIS PURCHASE IS LIMITED TO A MAXIMUM OF \$300.00 AT SALE PRICES; OR \$200 AT THE  
 SPECIAL 1/3 OFF PRICES. THIS ALLOWS UP TO \$100.00 SAVINGS OFF SALE PRICES!! AND  
 MUCH MORE OFF LIST PRICES. YOU CAN BUY ANY AMOUNT OF ITEMS AT THE SPECIAL 1/3 OFF  
 PRICE AS LONG AS YOU DON'T EXCEED \$200 AT THE SPECIAL 1/3 OFF PRICES!!

THIS COUPON CAN ONLY BE USED ONE TIME!!

Order	Item	List	Sale	1/3 Off Price
<input type="checkbox"/>	SCRIPT 64 - EXECUTIVE WORD PROCESSOR (Disk Only)	\$99.00	\$79.00	\$52.00
<input type="checkbox"/>	COMPLETE DATA BASE (Disk Only)	\$89.00	\$69.00	\$46.00
<input type="checkbox"/>	ELECTRONIC SPREAD SHEET (Tape or Disk)	\$89.00	\$69.00	\$46.00
<input type="checkbox"/>	ACCOUNTING PACK (Tape or Disk)	\$69.00	\$49.00	\$32.00
<input type="checkbox"/>	TOTAL 5.2 WORD PROCESSOR-PLUS (Tape)	\$69.00	\$56.00	\$37.00
<input type="checkbox"/>	(Disk)	\$79.95	\$64.00	\$42.00
<input type="checkbox"/>	TOTAL TEXT 2.6 WORD PROCESSOR (Tape)	\$44.95	\$39.00	\$26.00
<input type="checkbox"/>	(Disk)	\$49.95	\$42.00	\$28.00
<input type="checkbox"/>	TOTAL LABEL 2.6 (Tape)	\$24.95	\$18.00	\$12.00
<input type="checkbox"/>	(Disk)	\$29.95	\$23.00	\$15.00
<input type="checkbox"/>	QUICK BROWN FOX WORD PROCESSOR (Cartridge)	\$69.00	\$59.00	\$40.00
<input type="checkbox"/>	PROGRAMMERS HELPER (Disk Only)	\$69.00	\$59.00	\$40.00
<input type="checkbox"/>	BASIC TUTOR (Tape or Disk)	\$29.95	\$24.95	\$15.00
<input type="checkbox"/>	TYPING TUTOR (Tape or Disk)	\$29.95	\$24.95	\$15.00
<input type="checkbox"/>	SPRITE DESIGNER (Tape or Disk)	\$16.95	\$14.95	\$10.00
<input type="checkbox"/>	MEDICINE MAN (Tape Only)	\$19.95	\$17.95	\$12.00
<input type="checkbox"/>	WEATHER WAR II (Tape Only)	\$19.95	\$17.95	\$12.00
<input type="checkbox"/>	PROFESSIONAL JOY STICK	\$24.95	\$16.95	\$11.00
<input type="checkbox"/>	LIGHT PEN	\$39.95	\$29.95	\$20.00
<input type="checkbox"/>	DUST COVER	\$ 8.95	\$ 6.95	\$ 4.60

### SUPER BONUS COUPON DEAL!

	List	Sale	Bonus Price
80 COLUMN BOARD. 80 Characters per line on the screen at one time includes word processor, mail merge - data base, electronic spread sheet on two tapes. (For disk add \$10.00)	\$275	\$179	\$159

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY  
 • BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

**WE LOVE OUR CUSTOMERS**

John H. Scheele, President

**PROTECTO  
ENTERPRIZES**

WE LOVE OUR CUSTOMERS!  
 BOX 550, BARRINGTON, ILLINOIS 60010  
 Phone 312/382-5244 to order

**\$100****\$100**

## Creativity, continued...

individuals—through travel and immersion in new happenings—perpetually seek to re-experience the quality of freshness and the feeling of novelty.

### Curiosity

Creativity is, in an important sense, contingent upon the preservation of the curiosity and sense of wonder that are so apparent in youth and so conspicuously absent in many adults. The educational and developmental processes most people go through, while ostensibly preparing them for the responsibilities of adulthood, nevertheless manage to conventionalize them to the point where lively curiosity and wonder almost cease to exist.

In addition to, or perhaps as a consequence of this, many adults have a deep distrust of originality, imagination, and fantasy. They often display this by being quick to criticize or dismiss thoughts that cannot be defended with fact or logic. There is little doubt that this closed-mindedness has invested much of our social environment with a timid cautiousness which prevents many valuable ideas from taking root.

Children have a keen and intense awareness of their environment. They have a ready feeling of curiosity about everything they touch or come in contact with, a precious propulsion toward

---

## ***Creativity involves taking one step after another into pitch darkness.***

---

seeking understanding, toward piercing the mystery they sense in everything they perceive.

The rapt sense of children's wonder and the avid interest in the minutest details of their surroundings, indeed, the sheer poetic intensity of living, disappears sooner than any other characteristic of childhood. Only the truly creative individual manages to retain this early sense of curiosity. And it is thanks to this lively attitude of curiosity and inquiry that the creative person can constantly enrich and increase the store of information and experience that he draws upon when creatively engaged.

Another noteworthy characteristic of the creative person's wide-awake interest and attitude of inquiry is that it invariably extends far beyond the confines of his specialization or main line of work. His wide spectrum of interest embraces many related and unrelated areas, and

he can get excited about almost any problem or phenomenon that puzzles him. Many things that are taken for granted by others are for him pregnant with mystery, puzzlement, and challenge.

In this sense he is intellectually restless; not satisfied with what is accepted, established, or known; constantly wondering how things could or might be; always ready to consider and visualize new possibilities. He feels that it is necessary to improve upon, or add to, existing things.

It is said that necessity is the mother of invention, but there has been a curious lack of interest in discovering who the father is. Could it be that the father is curiosity?

### Feelings And The Unconscious

The creative person has more energy, is more impulsive, and is more responsive to emotions and feelings than is his less creative counterpart. Since he is more in touch with, and open to, his internal processes, the creative person has better access to the materials buried in his unconscious. Or, to put it differently, his ability to minimize his internal defenses and inhibitions—his relative lack of defensive distortions and repressions—enables him to have a more direct and uncluttered pipeline to the well of ideas in his unconscious.

According to psychologist Abraham H. Maslow, the really creative person is one who accepts his essentially *androgynous* character: "This is the person who can live with his unconscious; live with, let's say, his childishness, his fantasy, his imagination, his wish fulfillment, his femininity, his poetic quality, his crazy quality. He is the person, as one psychoanalyst said in a nice phrase, 'who can regress in the service of the ego.' This is voluntary regression. This person is the one who has that kind of creativeness at his disposal, readily available, that I think we're interested in."

According to Maslow's theory, there are two distinct kinds of creativity: primary creativity and secondary creativity. Primary creativity is the kind that emerges from the unconscious; is the source of new discovery, novelty, and ideas that depart from what exists at the moment; is common and universal to all people; is found in healthy children; comes from those who are able to play, dream, laugh, and loaf; comes from those who can be spontaneous, open to unconscious promptings and impulses; is present in those who accept their softness, femininity, and weakness; is found more among individuals who have a keen interest in the artistic and aesthetic fields.

Secondary creativity, on the other



hand, is the kind that comes primarily from the conscious; comes from rigid, constricted people who are afraid of their unconscious and are cautious and careful in everything they do; comes from those who can't play very well and who excessively control their emotions; is characteristic of those individuals who demand a high degree of order in their lives and who dislike poetry and other expressions of emotion; is present among those who drown their childishness and who are afraid of their softness and femininity and who repress all weakness.

According to Maslow, the healthy creative person is one who uses neither the primary nor the secondary processes exclusively, but who has managed a fusion or synthesis of both the primary and the secondary processes, of the conscious and the unconscious, of the deeper self and the conscious self.

Since the creative person puts greater trust into his feelings and intuitive sensings, he is readily able to use them as guides to steer him during the creative process toward unique solutions to his problems. When judging the relevance of ideas that come to him during the process, he measures their appropriateness and pertinence by their feeling of fit and harmony.

### Motivation

Basic to creative achievement is a strong desire to create. The creative person derives great satisfaction from his creative activities and is keenly interested in his chosen work and the materials with which he works. The difficulties that he encounters do not discourage him. He welcomes problems as personal challenges and looks forward to grappling with them. He assumes an optimistic stance vis-à-vis his problems and feels, like Pogo, that he is "confronted with insurmountable opportunities."

The creative person likes to pursue problems that are intrinsically of great



# DISCOVER THE MAGAZINE THAT HELPED LAUNCH THE MICROCOMPUTER INDUSTRY

Incredible as it may seem, *Popular Electronics* helped launch the microcomputer industry. Back in 1975, we published plans for building the first powerful microcomputer based on the 8080 cpu. These plans generated incredible excitement—and started the world thinking about personal computing.

Since then, we've added more coverage of personal computing. Today, so much of the magazine is devoted to microcomputers that we've changed our name to...

## Computers & Electronics

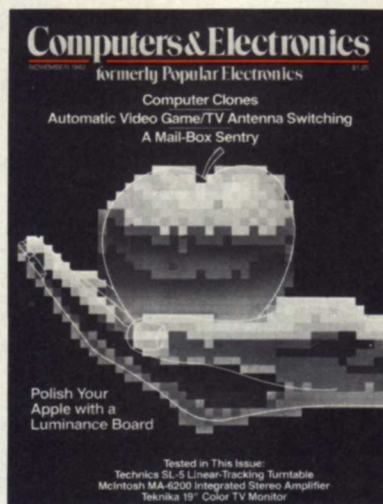
*Computers & Electronics* continues the *Popular Electronics* tradition of helping our readers experience the advances of the future—today. We do it with clearly written, in-depth articles explaining each innovation...plans for building useful, money-saving projects incorporating the newest technology...reviews of the latest mass-produced equipment. Whether it's microcomputer equipment, audio, video, or personal electronics, *Computers & Electronics* will make it possible for you to enjoy the newest, the most sophisticated, the most innovative technology around.

## Helpful buying guides

*Computers & Electronics* compares and contrasts computers and other electronics gear in meaningful buyer's guide articles. We discuss features and options, what to look for, and how to get the best value. Recent buyer's guides have covered computer printers, pocket computers, sophisticated telephones, video cassette recorders and high-tech audio cassettes.

## World-famous test reports

In every issue of *Computers & Electronics* you'll find our famous in-depth test reports. We take a new product, test it and analyze the results. Recently we've tested the Radio Shack TRS-80 Model III, the IBM Personal Computer, and the Sinclair ZX-81. Microcomputers by Apple, Atari, Hewlett-Packard, Intelligent Systems and Netronics. Plus an interactive data terminal, software,



and a variety of audio, video and testing equipment.

## Innovative construction projects

If you're a do-it-yourselfer, you'll love the construction projects in *Computers & Electronics*. Not only did we bring the world the first successful microcomputer kit, but also projects for building the first low-cost modem. The first computer keyboard integrated with the computer (SOL).

The first low-cost voice synthesizer. The first low-cost logic analyzer. The first 1802-based microcomputer (ELF). The first low-cost function generator. The first gas-laser communicator (awarded a place in the Smithsonian Institution). The first low-cost color graphics computer module. An interface to transfer narrow line listings from your TRS-80 Pocket Computer to either a printer or CRT screen....

As you can see, our construction projects, while not necessarily complex (thanks to multifunction IC chips), will keep you at the forefront of technological development—at remarkably low cost. And in the future, we'll be bringing you construction projects to help you make your microcomputer more useful—whether it's an enhancement, an application, or a merging of technology with external controls and products.

## Get the leader in the field— at up to 33% off!

*Computers & Electronics* is the world's most widely read computer and personal electronics magazine. Now you can subscribe at big savings: up to 33% off. At our New Subscriber rates, a one-year subscription is only \$12.97. Take advantage of this offer—complete and return the coupon or postage-paid reply card today!

## Computers & Electronics

P.O. Box 2774, Boulder, Colorado 80322

- ☐ **YES!** Send me one year (12 issues) of *Computers & Electronics* at \$12.97—I save 19%.  
☐ I prefer two years for \$22.97—I save 28%.  
☐ Make that three years for \$31.97—I save 33%.

Savings based on full one-year subscription price of \$15.97.

Mr./Mrs./Ms. \_\_\_\_\_ (please print full name) 8H492

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

CHECK ONE: ☐ Payment enclosed. ☐ Bill me later.

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

## Creativity, continued...

interest to him and is governed and guided more by internal stimulus than by external demand. He creates not because someone wants him to create, but because he must. In a sense, he is at the mercy of his own values and motivations and deals best with problems to which he has a strong emotional affinity.

The highly creative individual is frequently haunted by his problems and cannot let go of them. Anyone who has observed the creative person at work has been impressed by the total absorption and vigorous concentration that infuses his activity. His strong sense of purpose and commitment and the intensity of his encounter with problems shows strong ego involvement. And this ego involvement is responsible for the unusual tenacity that the creative individual exhibits.

The creative person is ready to engage in meaningful problem solving purely for the satisfaction that it provides and even when there is no other reward in sight. This explains why he goes to great lengths to find problems that interest him and challenge his capacities. His motives are more internal and goal-oriented than competitive, and he is not unduly influenced by what others may be expecting of him.

His chosen work is the most important avenue for the fulfillment of his life and his striving for completion. He is dedicated to what he is doing, and enjoys it. Unlike many human beings, he is not preoccupied with the pursuit of happiness, but finds his happiness in the pursuit of creative activities.

### Freedom From Fear Of Failure

Because the career orientation of most people is governed by the pursuit of success, the specter of failure looms large, and in the risk-taking enterprise of creativity, failures do sometimes occur. No new ground is completely secure under foot. One must respond positively to the risk and the challenge of exploring new frontiers. As Austin puts it: "Creativity involves taking one step after another into pitch darkness—not a fussy rearranging of familiar furniture in a flood lighted room."

The attitude that is requisite for risk-taking is well expressed by the American painter, Albert Pinkham Ryder: "Have you ever seen an inchworm crawl up a leaf or twig and there, clinging to the very end, revolve in the air feeling for something to reach? That's like me. I'm trying to find something out there beyond the place I have a footing."

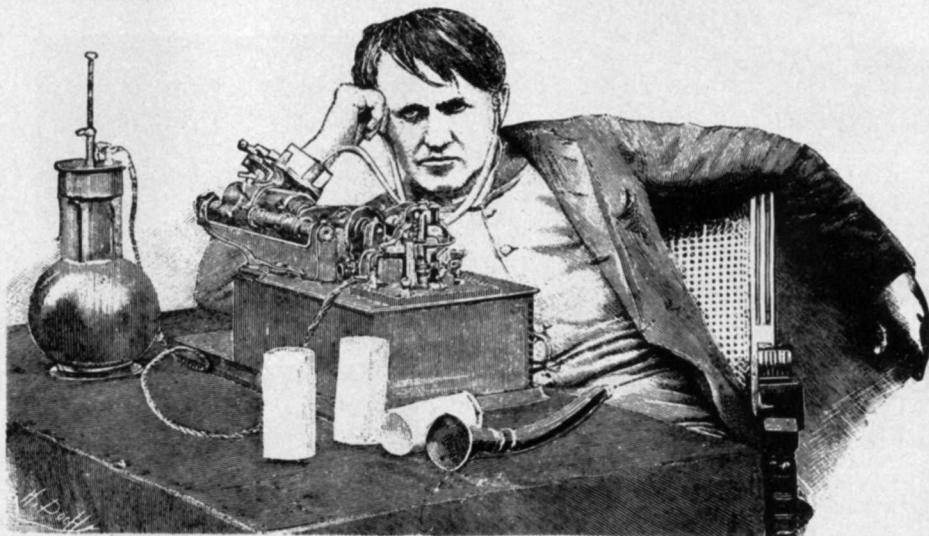
Fear of failure prevents many individuals from daring anything really creative, especially when risk is considerable. Their attitude of caution is dictated by their fear of failure. It casts a

shadow on them because of the self-induced responsibility for accurate judgment they have and the pride they take in their ability to work and plan successfully. This ability to exercise sound judgment nevertheless qualifies their willingness to risk the kind of leap into the unknown that is involved in genuine creative advances.

Actually, failure should be regarded as a "learning situation"—a situation from which new or improved ideas may arise. Almost every new development has had a history of failures that led ultimately to success. In reality, the greatest failure is the failure to attack a new idea at all.

### Persistence and Concentration

An enormous capacity for taking pains, a dogged persistence in the face of difficulties and frustrations, and a vast amount of sheer hard work are some of



the other outstanding attributes that mark the creative person. These qualities stand out in their biographies and are also the ones they emphasize most when counseling others with creative aspirations.

The popular notion that the creative individual relies mainly on effortless inspiration and enforced spontaneity is a widespread misconception. Few people realize that creative achievement requires a hard core of self-discipline and arduous, unceasing application. It also requires confidence, the maintenance of morale, and long-lasting pervasive excitement to resist stubbornly premature discouragement in the face of difficulties and temporary failures.

Although the creative person occasionally experiences failure, he is not downed, crushed, or maimed by it. He feels that any adversity he experiences is only temporary and will exhaust itself if he persists. As Einstein once remarked, "I think and think, for months, for

years. Ninety-nine times the conclusion is false. The hundredth time I am right."

From talking to highly creative individuals, it becomes clear that the majority of them are unfamiliar with the eight-hour workday. Their preoccupation with problems is incessant. Occasionally they may have moments in their work that are crowned with joy, when, for example, they find that ideas begin to flow after they have surmounted a disruptive hurdle.

But frequently the intense struggle with problems does not yield immediate solutions. As someone put it: "Creativity can be, and often is, a savage experience demanding hard work and the willingness to live with a task to a self-defined conclusion."

Creation is preceded by hard thinking, prolonged reflection, and concentrated hard work. There is a continuous assimilation of new knowledge and

experience, a continuous pondering of the causes of the difficulties that are encountered regularly, and a sorting out of hunches and ideas that flash across the firmament of consciousness. That all this takes time and willingness to experience and accept many agonies along the route is apparent.

Many creative individuals have been threatened—especially when their wastepaper baskets overflow with discarded worksheets—to quit their work for good. In the face of insoluble snags and feelings of helplessness, even digging ditches looks like an easy way out. But the next day they are back, probing and attacking problems, determined to complete what is unfinished, the image of road gangs all but forgotten.

Quite often conscious efforts in the beginning stages of creative problem solving are abortive and useless; creative individuals have testified that they frequently give up their efforts temporarily, that many of their initial attempts end in

failure, before valid solutions or ideas emerge. Still, all these apparently futile initial efforts are not wasted, but serve to activate the unconscious processes of cerebration and incubation. Without preparatory work, the unconscious can be notoriously unproductive.

It is true that some creative people rely deliberately on the gestative process of the unconscious to produce ideas for them. With most creators, however, a dogged and intense preliminary effort—much exhausting spadework—is the necessary prelude to original production. The capacity for original work grows out of long training, constant application, and unflagging persistence.

Since, in the course of creative work, a lessening of persistence frequently occurs—sometimes due to repeated failures, at other times to lessening of interest—the creative person soon learns to cope with this reaction.

Discomfort with persistence or a feeling of flagging interest is often a signal of the need to get away from a problem and relax for a while. Creative individuals often find that they can relax by attacking another challenging problem. Many of them say that they function best when involved in several undertakings simultaneously, each at a different stage of development, each affording an



opportunity to relax when interest or ability to persist in working at one problem fails.

The creative process also requires concentration and continuous thinking to the extent that the creative person becomes oblivious to his surroundings. During the creative process he maintains an uninterrupted rapport with his unconscious and formulates the emerging proposals into a sensible solution. This requires disciplined concentration.

Philosopher Richard Guggenheimer explains it this way: "A great disciplinary effort is required for most productive minds before they reach a stage where they are able to swiftly

launch themselves into completely spontaneous absorption in the creative business at hand. A thousand and one diverting thoughts must be suppressed; the mind must brush aside myriad temptations to amble here and there along the enticing byways of casual thinking. It must become totally involved in the mounting wave of its deep intent. The principal labor is getting the wave started; most of us splash about in our thinking and mistake the ripples of our noisy commotion for real movement."

Of course, when there is a complete and wholehearted absorption in the business at hand, the activity itself helps the process along. Suggestions on how to proceed occur spontaneously. The creative person no longer has to use his energy to force his mind to concentrate on the problem. Where great disciplinary effort is invariably required, however, is at the beginning stages of the problem solving process. It is at these stages that many extraneous thoughts must be discarded or suppressed in order to plug into the creative current. □

*Mr. Raudsepp's profile of the creative individual will be continued next month.*



**FRANKLIN**

ACE 1000 .....\$845  
**ACE PRO System**  
 ACE 1000 w/Color, ACE 10 Drive,  
 80-Column Card, ACE Writer II,  
 ACE Calc (80-Column Spreadsheet)  
 .....\$1295  
 ACE 1200 (128K, Dual Processor,  
 1 Drive, 80-Column) .....\$1499  
 12" Monitor w/ACE systems .....\$100



**COMPAQ**

**COLUMBIA**

DATA PRODUCTS, INC.

128K RAM, Dual DSDD Drives (640K)  
 Fully IBM PC Compatible.....\$CALL  
 Portable MPC (New!) .....\$CALL

**TOSHIBA**

T100 (280A, CP/M, CBASIC II,  
 TBASIC) .....\$CALL  
 T200 (8085A, CBASIC II, 560K)  
 .....\$CALL  
 T250 (8085A, CBASIC II, 2 MB)  
 .....\$CALL



**DARK HORSE?**

## COMPUTERS

Eagle II .....\$1695  
 Morrow Designs (MD2) .....\$1185  
 (MD3) .....\$CALL  
 Corona PC (New!) .....\$2095  
 BASIS 108 (128K, 6502/Z80) .....\$2195  
 TeleVideo 803 .....\$2045  
 KAYPRO II, IV & 10 .....\$CALL

## PRINTERS

ANADIX DP-9000A .....\$1189  
 BYTEWRITER .....\$589  
**C-ITOH**  
 Prowriter I .....\$379  
 F-10-Starwriter .....\$1249  
 DAISYWRITER 2000 EXP .....\$1119  
 DTC 380Z (48K Buffer) .....\$CALL  
**EPSON**  
 MX-80 III F/T .....\$475  
 MX-100 III F/T .....\$615  
 FX-80 (160 CPS) .....\$535  
 RX-80 (New!) .....\$CALL  
**IDS**  
 Microprism 480 .....\$515  
 Prism 80 Color .....\$1369  
 Prism 132 Color .....\$1499  
**MANNESMAN TALLY**  
 MT 160L (160 CPS) .....\$725  
**OKIDATA**  
 Microline 92 .....\$519  
 Pacemark 2350P .....\$2045

QUME Sprint 11-40 .....\$1489  
 SILVER-REED EXP 550 .....\$719  
**STAR MICRONICS**  
 Gemini-10X (120 CPS) .....\$329  
 Gemini-15 .....\$479  
 TOSHIBA P1350 .....\$CALL  
**TRANSTAR**  
 315 (Color Printer) .....\$CALL  
 130 .....\$719

## MONITORS

**AMDEK**  
 V-300 (12" Green) .....\$139  
 Color-I Plus .....\$305  
 Color-III (RGB) .....\$359  
**COMREX**  
 CR-6500 (13" Color) .....\$299  
 CR-6600 (13" RGB) .....\$425  
**NEC**  
 JB1201M (12" Hi-Res.) .....\$159  
 JC1203DH (12" RGB) .....\$679  
**TAXAN**  
 KG-12N (12" Green) .....\$119  
 KG-12N/UY (12" Amber) .....\$125  
 RGBvision-I (380 HL) .....\$279  
 RGBvision-III (630 HL) .....\$499  
**USI**  
 Pi-1 (9" Green) .....\$109  
 Pi-2 (12" Green) .....\$149  
 Pi-3 (12" Amber) .....\$159  
 Pi-4 (9" Amber) .....\$139

## DISK DRIVES

RANA Elite One .....\$270  
 Fourth Dimension .....\$249  
 AMDEK DSDD Thinline (IBM) .....\$309

CALL FOR PRICES ON CORVUS,  
 DAVONG, PERCOM, MPI &  
 SHUGART WINCHESTER HARD  
 DISKS.

## FIRMWARE

**ALS**  
 Z-Card II (CP/M 2.2) .....\$135  
 Smarterm II .....\$135  
**AST Research**  
 Megapius w/1 Serial Port .....\$295  
 Combopius w/Serial & Par. ....\$295  
 I/O Plus II .....\$145

**MicroSoft**  
 Premium Pak .....\$459  
 SoftCard (CP/M & MBASIC) .....\$225  
 16K RAM Card (Apple) .....\$72  
 64K RAM Card (IBM) .....\$249

**MICROTEK** Dumping-GX .....\$109  
**ORANGE MICRO**  
 Grappler + .....\$119  
 Buffered Grappler + .....\$189  
**QUADRAM Products** .....\$CALL

## MODEMS

**HAYES**  
 Micro Modem II .....\$269  
 Smartmodem 1200 .....\$509  
 Smartmodem 1200B (IBM) .....\$CALL  
**NOVATION Products** .....\$CALL  
**SSM Products** .....\$CALL  
**VEN-TEL** (2400 Baud) .....\$CALL

Money Order, Personal Check & COD  
 Honored. Please ADD 1% for VISA,  
 MC or American Express Order.

**GENTECH**

150 Broadway (Suite 2212), NY, NY 10017

FOR ORDERS ONLY (800) 843-4302  
 FOR INQUIRIES (401) 273-2420  
 274-0330

Mon.-Sat. 9 AM - 9 PM  
 TWX: 710-381-6483 GENTECH

# Randomness and the Mind

## Looking for Psychic Effects in Games of Chance

---

### Helmut Schmidt

---

Does the outcome of a game of chance depend on the player's mental effort? Certainly effort can help where skill and strategy count. But what about pure chance games like roulette, or those computer games in which we can do nothing but wish for success?

With these questions we strike the core of an ongoing controversy about the existence of some "psychic" effects that may not quite fit into our present worldview.

The first laboratory reports that gamblers and other people might mentally affect the outcome of dice falls were published in 1942 by L. and J.B. Rhine who labelled this the "psychokinetic effect" (PK).

These early claims were, rightly or wrongly, much criticized. The effects were rather small. Even the best performers scored only slightly better than chance would dictate. Statistical evaluation methods were required to detect the effect—like a weak signal in much noise. The critics wondered in particular whether the manual recording of thousands of dice throws might have left room for systematic recording errors.

The introduction of electronic test equipment has revitalized this kind of research. We no longer have to worry about recording errors or the monotony of dice throwing. Any home computer can be programmed to act as electronic dice tumbler or coinflipper to tally the scores and to present the participant with stimulating feedback.

Using such test equipment, several research groups have reported weak, but, nevertheless, significant PK effects.

---

And this type of work is being continued in physics and engineering departments of universities, industrial research laboratories, and private research foundations.

But with the reported effects rather weak and at odds with our conventional thinking patterns—with what we call common sense—many critics still see

---

### ***We certainly want to know whether or not mental effort matters in games of chance.***

---

room for doubt in the reality of psychic effects. Could it be, perhaps, that the researchers overlooked something, that they made some blunder, or that they even have an urge to deceive themselves or the public?

This psychic controversy is carried out in the home territory of computer enthusiasts. And we certainly want to know whether or not mental effort matters in games of chance.

After some experimenting, I am no longer neutral in the controversy. But rather than discuss my own results, I want to show you how you can try to catch PK in action. If a large number of experimenters were able to observe the effect, the question about its existence would be settled once and for all.

Experimenting in this field can be



great fun. We can design and play challenging games, and at the same time do fundamental research. This may be one of the few areas of science in which the newcomer can still contribute to progress.

### **From Dice to Radioactive Decay**

The early researchers saw psychokinesis as a mental "force," comparable to the known electric or magnetic forces. Surprisingly, however, the participants in their experiments seemed able only to affect *rolling* dice; they could not exert a measurable force on a die placed on a sensitive scale or suspended as a pendulum on a string.

What makes a rolling die different is the element of randomness that enters into the outcome. And today it appears that PK might be able to act wherever truly random processes are in progress.

The idea that part of nature may be governed by pure chance, was one of the more sensational outcomes of modern physics. The textbook example of a pure chance process is radioactive decay. If I

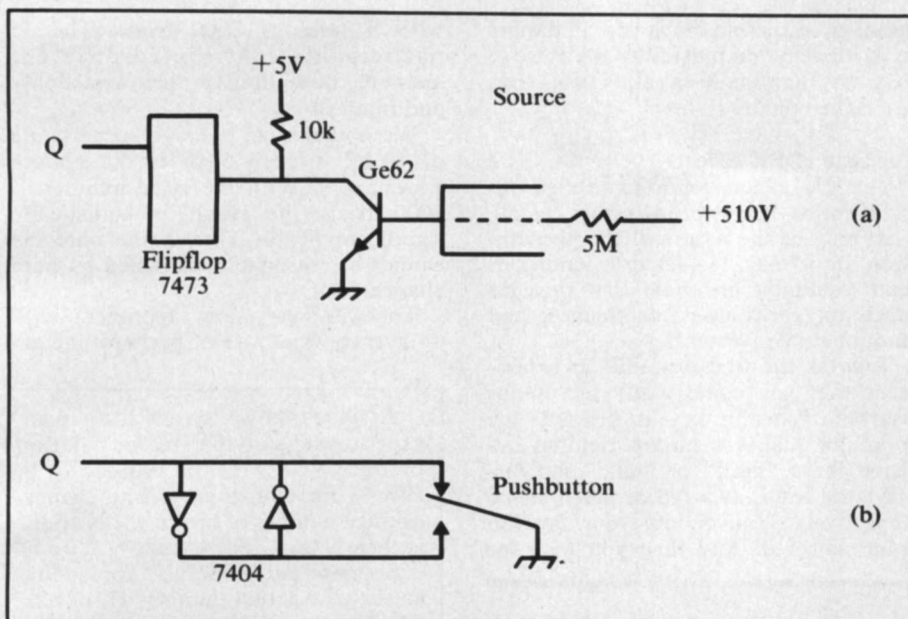


Figure 1. (a) Geiger Counter Circuit. The flipflop is toggled at random time intervals. Position the source for an average counting rate of about 40/seconds.

Geiger Tube: Amperex 18504

Source: Sr90, 0.1 $\mu$ C (from Nucleus, P.O. Box R, Oak Ridge, TN 37830).

(b) The electronically clean manual switch can also provide truly random timing.

have a sample with many atoms of radioactive Strontium 90, then I can register the individual atomic breakups as clicks on my Geiger counter, and I can calculate that a Strontium atom has an average lifetime of 30 years. But according to quantum theory it is impossible to predict when a particular atom will decay. There seems no mechanism inside the atom that determines the decay in a computerlike (deterministic) manner. The decay is rather the result of pure chance.

The first successful attempt to mentally affect radioactive decay was reported by R. Chauvin in Paris. In this experiment children tried to speed up or slow down the counting rate of a Geiger tube during one minute time intervals. This appeared to work more often than not. Two 13-year-old boys were particularly successful as long as the experimenter could keep them sufficiently motivated and excited about the experiment.

Chauvin's neat experimental setup has some minor practical disadvantages: the base counting rate must be re-calibrated frequently, the power supply must be very stable, and the experimenter must make certain that a fraudulent participant does not introduce his own radioactive source (such as a radioactive watch dial) to affect the counting rate.

Therefore, in my own experiments, I used the randomness of radioactive decay slightly differently, as basis for a

digital random number generator (RNG). I then had the participants try to affect the output of the RNG.

The basic idea behind the RNG experiment is very simple: you have a very fast and regularly advancing binary counter which you stop at the random time at which the Geiger tube registers the next signal. Then the lower digits of the counter stop in truly random positions, provided that the average waiting time for the next signal is long enough that these digits have been turned over many times.

#### A True Random Number Generator

To implement the RNG with a computer, you can use the external circuit of Figure 1a which connects to an input port Q of the computer. The flipflop in Figure 1a changes state with every decay signal, i.e., at random intervals. A machine language program loop can provide the needed fast counter. Figure 2 shows a corresponding flow chart.

But remember that your computer may steal computer time for the direct memory access of the screen display. In this case you must disable the interrupts to guarantee the smooth progress of the counter while you are waiting for the next random number. If you don't want the screen to flicker for each random number request, you must generate and store all needed random numbers at the start of the game. You could also avoid screen blanking by including a fast hard-

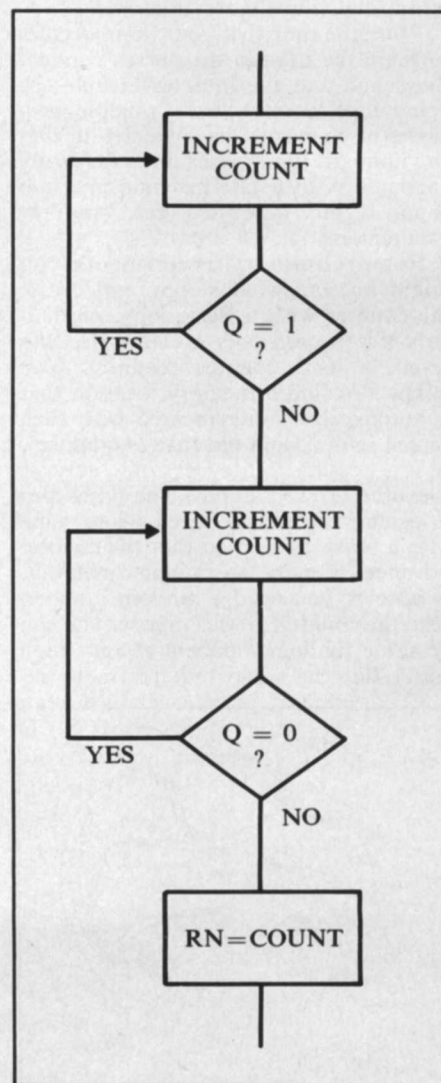
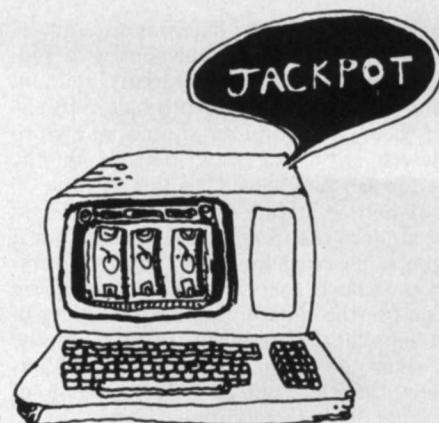


Figure 2. A random number, RN, is generated by stopping a fast counter at a random time, when the input Q goes from 0 to 1. The lower bits (or digits) of RN are truly random, provided that the average waiting time for a Q change is long enough, so that these bits (or digits) have been turned over many times.

## Randomness, continued...

ware counter in the external circuitry.

With the arrangement shown in Figures 1a and 2, you get truly random numbers. Even if you produce millions of them, no computer should be able to detect any systematic pattern in the sequence.

I had great fun and no difficulties in setting up the Geiger tube circuit. But if you don't need too many random numbers at once, there is an easier way. You can use the randomness in the timing of a manual buttonpush. Instead of the Geiger tube setup in Figure 1a, you connect the electronically clean switch of Figure 1b to the computer input. For an even simpler setup, you can let a computer key take over the role of the external switch in Figure 1b as well.

From the time that your brain decides to press the key, as the nerves conduct the signal and the muscles execute the command, so many truly random processes in your body have entered in that the timing is (within certain limits) truly random. With a fast machine program loop, you should get perfect randomness.

For preliminary experiments you might be somewhat sloppy and create the counter with a Basic loop, particularly if you need only a binary decision (even or odd counter reading). You might also find a memory location that is automatically incremented with each screen refresh, and use that as counter.

It is possible to use electronic noise as a source of randomness. The basic idea is again very simple. Feed white noise into a pulse counter so that the counter advances rapidly at random intervals. Whenever you need a random number, read the counter. In this manner you can generate random numbers at very high rates. But the setup requires more ex-

ternal circuitry and much care in design. In particular, you must filter the noise so that no marginally weak signals can reach the counter.

### The Size of PK Effects

The PK effects reported in rigorous experiments have been rather small. That may be the nature of the phenomenon, or it may be that test conditions tend to inhibit an effect that depends much on enthusiasm, confidence, and emotional involvement.

Take as the first example an experiment that you could easily set up for yourself. When a key is pressed, the computer makes a binary random decision for a "head" or "tail," and displays the result as a red or green signal respectively. You choose your favorite color, say, red. And then you wish for

## *It is possible to use electronic noise as a source of randomness.*

red to appear whenever you press the key. You might do this in a very relaxed atmosphere, taking much time to visualize the target color. You could also use a more aggressive approach, fighting for each trial. In either case you should start a test session only when you feel in top shape, and keep the sessions short (perhaps 20 trials per session). Stop whenever you want. The computer tallies the hits and misses (red and green signals) and at the end of each session you record the scores, manually, or automatically on disk. If you like the setup and the results look promising, then you might go on and try to accumulate "statistically significant" results (see Table 1).

When I tried this experiment, I used two colored lamps as a display. The lamps were in sockets close to the participant; the RNG, computer, and recorder were in another room. It was easy to verify that the RNG alone, running by itself in the absence of onlookers, showed no bias. But as an additional safeguard, I used in the PK test each of the two sockets (connected to "heads" and "tails") equally often as the target side. The participant simply inserted his favorite color lamp into the target socket. In this way, even a constant generator bias could not simulate a PK effect.

I did not seem able to produce PK effects myself, but I found several promising volunteers who enjoyed the experiment. When we felt sufficiently confident, I began a "real experiment"

with a total of 3000 trials. The 35 participants contributed different amounts, depending on their availability and interest.

We obtained an average success rate of 54.5% (where 50% is the chance expectancy). With the large number of 3000 trials the result is statistically significant (Table 1), i.e., the outcome cannot be reasonably explained by pure chance.

This was a very slow experiment, with an average trial rate of perhaps one ev-

Assume that we have  $N$  trials in an experiment, and that each trial can produce a hit with the probability  $P$  ( $P=1/2$  for coin tosses). The chance average number of hits in the  $N$  trials is then  $N*P$ .

Suppose our game was successful, so that the actual number,  $H$ , of hits is larger than  $N*P$ . Then we want to know whether we were just lucky, or whether the result is due to some systematic effect (like a loaded die, a warped coin, a biased RNG, or, if everything else can be excluded, PK).

To estimate the significance of a particular score, let us ask: What are the statistical odds against obtaining this number  $H$  or a higher number of hits as result of a chance fluctuation? These odds can be obtained from the  $Z$ -value:

$$Z = (H - N*P) / \text{SQR}(N*P * (1-P)).$$

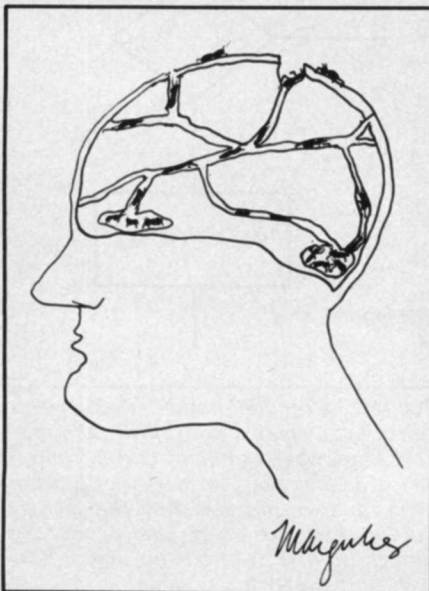
This value tells by how many standard deviations the result lies above the chance level.

Then we can use available tables to calculate the corresponding "odds against chance." The following table is sufficient for most purposes:

$z$	Odds
1.65	20:1
2.17	50:1
2.33	100:1
3.09	1000:1
3.71	10000:1
4.26	100000:1
4.75	1000000:1

Let me take as example the mentioned experiment, where clicks were presented at very high speed to the right (hit) or left (miss) ear. In a total of  $N=200,000$  binary trials, the number of hits was  $H=100,774$ . (That gives the mentioned scoring rate of 50.39%.) With these values for  $N$  and  $H$ , and  $P=1/2$ , we get  $z=3.46$ . And from the table we see that the odds against chance (as an explanation of the high score) were larger than 1000:1.

Table 1. Statistical Significance.





**QUEST** — A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. TRS-80 Color, and Sinclair, 13K VIC-20. Extended BASIC required for TRS-80 Color and TI99/A. \$14.95 each.

32K TRS 80 COLOR Version \$24.95.

Adds a second level with dungeons and more Questing.



**WIZARDS TOWER** — This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC. 13k VIC, Commodore 64, TRS-80 16k Extended BASIC, TI99/A extended BASIC. \$14.95 Tape, \$19.95 Disk.

**Authors** — Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

## ZEUS



**ZEUS** — It's fast and furious as you become the WIZARD fighting off the Thunderbolts of an angry ZEUS. Your Cone of Cold will destroy a thunderbolt and your shield will protect you — for a while. This is the best and highest speed arcade action we have ever done. Difficulty increases in wave after wave, providing hours of challenging fun and a game that you may never completely master. Commodore 64, Vic20 (16k expander), and 16k TRS-80 Color Computer. (ALL MACHINE CODE!)

\$19.95 tape \$24.95 disk. (Tape will not transfer to disk.)



### ADVENTURES!!!

The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Now available for TI99. Any Commodore 64.

\$14.95 Tape — \$19.95 Disk.

### ESCAPE FROM MARS (by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

### PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!



**SEAWOLFE** — ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color. NOTE: tape will not transfer to disk!

\$19.95 Tape — \$24.95 Disk.



**Dungeons of Death** — This is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. 16k Extended TRS-80 Color, 13k VIC, Commodore 64. At the normal price for an Adventure (14.95 tape, \$19.95 disk), this is a giveaway.

**Dealers** — We have a line of about 100 original programs for the machines listed here. We have High speed Arcades, Quality Adventures, Word processors and Business Software for Small machines. Better yet, we have excellent Dealer support. Phone for information.

Send \$1.00 for Complete Catalogue - Please specify system on all orders - \$2.00 Shipping Charge on each order



**AARDVARK L.T.D.**  
 2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110  
 Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.



## Randomness, continued...

ery 15 seconds. With higher trial rates one might hope to gather data more efficiently.

To study an extreme case, I used random noise to obtain binary decisions at a rate of 300 per second. This time, the heads and tails were clicks in a right or left headphone. That way, you cannot quite distinguish the individual clicks. But you still hear statistical intensity fluctuations. And for obtaining more heads than tails you can aim at more action in the right headphone. Since this takes much concentration, I used only short runs of 1000 trials (about three seconds).

In a total of  $N=200,000$  trials (200 runs), we got a success rate of only 50.39%. But the result was still significant (Table 1).

The decline of the scoring rate at very high speeds is certainly disappointing, but not surprising. There was really not

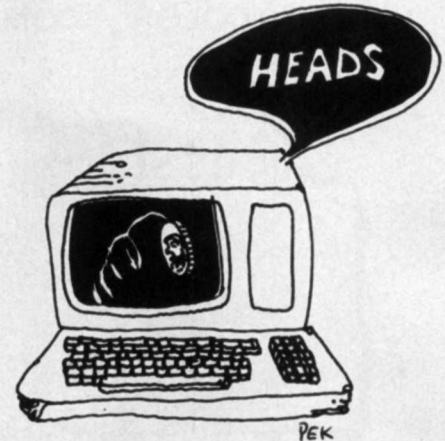
enough time to focus on each individual event.

### Right and Wrong Mental Attitude

If PK is real, one wonders what practical role it may play in our lives. With the effect rather weak, nature may have decided to use it only sparingly. To succeed in life, even I would rather trust my powers of sound reasoning than my PK powers.

But you don't have to be a professional gambler or a salesman to realize that there are some situations in which we can do nothing but wish for a good outcome. And if PK could help us to increase our chance of success by only a few percent, it might be worth the effort.

We can simulate real life situations with games and study how chance may



your steps are bad?

Fortunately, being scared can be fun (that's why we watch Hitchcock movies), so experimenting with your friends or with groups of children can be quite enjoyable.

### Quasi Random Generators

In slow games, like the last one, the timing of key presses can provide all the randomness we need. For fast action with many random decisions, an external random source with radioactive decay or electronic noise comes in handy. But can we perhaps use the Basic RND function instead?

This function is based on a quasi-random algorithm. Starting from a seed number, the algorithm derives a sequence of numbers that appear to be random. Nevertheless, the whole sequence is pre-determined by the seed number.

Listing 1 contains its own quasi-random algorithm. After a seed number is entered, the program prints HEAD or TAIL in quasi random sequence, and after 100 trials the score is tallied. For a simple PK test you might display the heads and tails as high and low tones. Note that using the same seed number twice, leads to the same sequence and the same score. And no PK effort can change that.

We might give the PK mechanism a chance to act by selecting the seed number randomly, by the timing of an initial key push. Then the outcome would be unpredictable and you would almost always get different sequences of heads and tails. But with the seed number and the outcome of the game fixed at the start, you would feel rather foolish making a mental effort during the game. You wouldn't want to assume that such effort could retroactively aid in the selection of a favorable seed number. But try it anyway, particularly with participants who do not know the details.

There is another way to bring the psychic element into play more directly.

**You don't have to be a professional gambler or a salesman to realize that there are some situations in which we can do nothing but wish for a good outcome.**

be affected by the right or wrong mental attitude.

The results of the following simple game may surprise you. A player advances in single steps by pressing a key. With each step, the computer obtains a true random number in the range from 1 to 4. For a 1, 2 or 3 you hear a pleasant low tone, you have made a "safe" step. If, however, the random decision is for a 4, you hear an unpleasant loud beep or explosive sound. The player's goal is to take as many safe steps as possible.

Try first a positive approach. Spend some time putting yourself in a calm, confident mood. (Try to recall and savor a situation in which you were particularly successful.) Then start the game. After a false step, stop for a moment to regain your confidence, and stop the game for the day whenever you feel apprehension or fear of a false step welling up.

Next explore the effect of a negative mental attitude. Imagine vividly how scared you are of a false step (Think about stepping on a bomb, getting an electric shock, or feeling the dentist's drill hitting a nerve). How are you scoring now? Can the negative attitude work against you, so that more than 25% of

```
10 P=524287:M1=79:M2=3067
20 H=0:T=0
30 ?"ENTER 6-DIGIT SEED":INPUT R
40 FOR TRIAL=1 TO 100
50 R=M1*R-P*INT(M1*R/P)
60 R=M2*R-P*INT(M2*R/P)
70 IF R>262143 THEN 90
80 ?"HEAD":H=H+1:GOTO 100
90 ?"TAIL":T=T+1
100 NEXT TRIAL:?:?:?
110 ?"HEADS=";H;"TAILS=";T
```

Starting from a seed number  $SEED=R(0)$ , the algorithm provides a sequence  $R(1), R(2), R(3), \dots$  of quasi random numbers, where  $R(N+1)$  is obtained from  $R(N)$  by the Basic substitution

(1)  $R = M \cdot R - P \cdot \text{INT}(M \cdot R / P)$ , with

(2)  $P = 2^{19-1} = 524287, M = M1 \cdot M2 = 242292$ .

Note that  $R(N+1)$  is the remainder in the division of  $M \cdot R(N) / P$ , so that all  $R(N)$ s are restricted to the interval

(3)  $0 < R < P$ , provided that the seed is not zero or a multiple of  $P$ .

One can show, that sequence (1) repeats only after  $P-1$  steps, and that each number in the interval (3) appears exactly once in the sequence.

Noting that, in binary notation,  $P$  is a row of 19 1's, the interval (3) covers all binary 19-digit numbers, with the exception of 0 and  $P$ . Using the particular form of  $P$ , one could write a very fast machine language routine for the algorithm (1).

The program lines 50 and 60 split the algorithm (1) into two steps. That prevents the appearance of too large integers that your computer might truncate. Line 70 makes a decision with the probability  $1/2$ .

Listing 1. Quasi Random Algorithm.

# Call "THE COMPUTER-LINE" in Colorado

"Committed to bringing computers within the reach of all Americans"™

The Computer-Line believes that it is important to be competitive by offering low prices; however, we regard service as the most important aspect of a mail-order organization. All our lines are available so that you, the customer, are able to talk to fully qualified computer specialists trained to answer all your questions pertaining to our line of microcomputers. We are renowned for our excellent after-sales support and our promptness for delivery. Peace of mind and excellence in service is our pledge to all our customers.

## Products for the IBM PERSONAL COMPUTER

### The Ultimate Peripheral for your IBM from MBI MONTE CARLO™ GT™ CARD

- Five Functions — Memory/Serial/Parallel/Clock/Joystick
- Up to 1 Megabyte Expandable Memory
- One IBM Compatible Centronics Parallel Port
- One IBM Compatible Asynchronous Communication Port
- Clock/Calendar (Battery-backed) with Alarm
- Dual Port Joystick Interface
- Future Upgrade Options: Direct Connect Modem

....\$CALL

### NEW! Monte Carlo™ Quatro™ CARD

All the features of the GT™ Card, but without the joystick ports

.....\$CALL

#### I-C — MAGIC

##### Universal

Programmable Graphics Screen Dump  
Print Spooling up to 64K  
Terminal Emulation .. \$CALL

#### QUADRAM CORPORATION

Quadboard:  
The memory board for the IBM .. \$CALL  
Microfazer: .. \$CALL

#### Princeton Graphics Systems: RGB Monitor

- 690 dots horizontal
- 16 colors
- Non-glare Screen
- Outstanding Monitor Special'

.....\$CALL

#### Tandon Disk Drives

TM-100-2 ..... \$245.00  
Thinline TM-55 ..... \$245.00

#### IBM SOFTWARE

Ashton-Tate:  
D. Base II ..... \$475.00  
Continental:  
Home Accountant Plus ..... \$ 99.00  
Lifetime Systems:  
Volkswriter ..... \$149.00  
Visicorp:  
256K Visicalc ..... \$185.00  
Visidex ..... \$185.00

#### RAM SPECIAL

4164 Dynamic Ram ..... \$5.00 ea.  
We can supply the quantity & price  
Dealers and Manufacturers need.

## Products for the APPLE COMPUTER

### MBI: VIP CARD

Dual Port Parallel/Serial Graphics Card ..... \$119.00  
Appletime Clock Card ..... \$ 79.00

### DISKDRIVES

Rana: Elite I, II & III ..... \$CALL  
Fourth Dimension: without controller ..... \$CALL  
Devong Hard Drives: 5, 10 & 15 Available ..... \$CALL

#### APPLE SOFTWARE

Continental:  
The Home Accountant ..... \$ 54.00  
Silicon Valley Systems:  
Word Handler ..... \$119.00  
List Handler ..... \$ 65.00  
Stoneware:  
DB Master ..... \$159.00  
DB Utility 1, 2, 3 ..... ea. \$ 69.00  
Visicorp:  
Visicalc 3.3 ..... \$179.00  
Visifiles ..... \$185.00  
Visidex ..... \$185.00  
Visitrend ..... \$229.00

Call for Prices on:  
Apple IIe  
Franklin Ace 1000/1200

#### RAM CARDS:

Microsoft 16K ..... \$ 79.00  
CP/M for APPLE:  
Microsoft Z80 Card ..... \$269.00  
Advanced Logic ..... \$CALL  
Kensington System Saver: ..... \$ 69.00  
T & G:  
Joysticks ..... \$ 44.00  
Select-A-Port ..... \$ 44.00  
Game Paddles ..... \$ 29.00  
Kraft:  
Joysticks ..... \$ 49.00  
Game Paddles ..... \$ 33.00  
80 Column Cards:  
Videx with Softswitch ..... \$279.00

#### WORD PROCESSING SPECIALS

On-line Screenwriter ..... \$ 85.00  
Pro ..... \$149.00  
Silicon Valley Word Handler ..... \$119.00

For 24-hour/7 Days a Week Ordering & Product Information,

Call "Compu-Line"™ our Computer Modem Line  
**1-303-279-4218**

Operates at 300 Baud, Full Duplex

#### MODEMS

"U.S. Robotics: 2 year warranty  
300 Baud ..... \$179.00  
1200 Baud ..... \$469.00  
D.C. Hayes:  
Micromodem II (Apple)  
w/o Terminal Program ..... \$259.00  
Smartmodem 300 Baud ..... \$209.00  
Smartmodem 1200 Baud ..... \$525.00  
Smartcom II ..... \$ 85.00  
Novation:  
J-Cat RS232 Direct Connect ..... \$114.00  
Cat ..... \$149.00  
Smart Cat 1200 Baud ..... \$455.00  
Applecat II (Apple) ..... \$289.00

#### WE NOW CARRY:

Commodore 64 ..... \$CALL  
Panasonic JR200 ..... \$ 299.00  
Percom Hard Disk Prices  
5, 10, 15, 20 Megabyte ..... \$CALL

#### COLUMBIA DATA PRODUCTS, INC. IBM Compatible Computer

- 16 Bit 8088 Processor
- 128K on Motherboard
- 2 Drives
- Disk Controller
- 2 RS232 Serial Ports
- Centronics Parallel Port
- 8 Expansion Slots
- And More!

NEW!! Columbia Data Products, Inc.  
Portable Computer

#### DISKETTES

Kangaroo:  
"The disks with the JUMP on the competition"  
10 year warranty & Library Case  
5 1/4" SS/DD (Boxes of 10) ..... \$21.95  
5 1/4" DS/DD (Boxes of 10) ..... \$30.95  
NEW! The '6-Pak'  
5 1/4" SS/DD (Boxes of 6) ..... \$14.95  
5 1/4" DS/DD (Boxes of 6) ..... \$19.95  
Verbatim Diskettes:  
5 1/4" SS/DD (Boxes of 10) ..... \$23.95  
5 1/4" DS/DD (Boxes of 10) ..... \$43.95  
Elephant Diskettes:  
5 1/4" SS/DD (Boxes of 10) ..... \$22.95  
5 1/4" DS/DD (Boxes of 10) ..... \$29.95  
Dysan: Outstandingly low priced  
5 1/4" SS/DD (Boxes of 10) ..... \$31.95  
5 1/4" DS/DD (Boxes of 10) ..... \$39.95

#### PRINTERS

C.Itoh Printers:  
Prowriter I Parallel ..... \$CALL  
Prowriter II Parallel ..... \$CALL  
F10 Starwriter  
Letter Quality 40 CPS Printer, Diablo  
Standard Daisywheel ..... \$1195.00  
F10 Printmaster  
55 CPS ..... \$CALL  
Okidata:  
Microline 92: 160 CPS bidirectional with 40 CPS  
correspondence, 80 column ..... \$529.00  
Microline 93: 160 CPS bidirectional with 40 CPS  
correspondence, 132 column ..... \$ 899.00  
Pacemaker 2350: 350 CPS bidirectional/2 color  
printing, 136 column,  
Parallel ..... \$2099.00  
Serial ..... \$2199.00  
Pacemaker 2410: 350 CPS bidirectional/2 color, printing  
85 CPS correspondence,  
Parallel ..... \$2399.00  
Serial ..... \$2499.00  
Star Micronics:  
Gemini 10 & 15 ..... \$CALL  
NEW! Gemini 10X:  
Improved throughput ..... \$CALL  
IDS Prism:  
132 Color ..... \$1495.00  
Smith Corona:  
TP-1 Parallel or Serial ..... \$ 549.00

Call for Prices on Epson's New FX Series!!

#### MONITORS

Amdek:  
Color I ..... \$299.00  
Color II ..... \$499.99  
300G Green ..... \$145.00  
300A Amber ..... \$159.00  
BMC:  
15MHZ Green ..... \$ 89.00  
20MHZ Green ..... \$149.00  
NEC:  
1201 Green ..... \$145.00  
1212 Color Composite ..... \$299.00  
1203 RGB Hi-Res Color ..... \$599.00  
Zenith:  
ZVM-121 17MHZ ..... \$ 99.00  
Taxan:  
Amber ..... \$145.00



# Call "THE COMPUTER-LINE"

7 days a week — Mon.-Fri. 7 am to 8 pm; Sat.-Sun. 8 am to 6 pm  
(Mountain Standard Time)

Product Information & Order Lines:

**(303) 279-2848 or (800) 525-7877**

Customer Service & Order Inquiry Line: (303) 278-8321

ORDER DEPARTMENT: COMPUTER-LINE, Inc. • 1019 8th Street • Golden, CO 80401  
COMPUTER-LINE of Denver • 1136 So. Colorado Blvd. • Denver, CO 80222

Look for our  
"Computer-Line" Stores  
opening throughout the U.S.  
Write for our Franchise Package.

TERMS: All prices reflect a 2.9% cash discount. All goods acknowledged faulty on receipt by the customer will be repaired or replaced at our discretion. Customers must call for an RMA number before returning any goods. This facilitates our quick attendance to faulty goods. We reserve the right to repair or return to the manufacturer for repair all goods becoming faulty within the specified warranty period. Any goods (hardware or software) returned for restocking are subject to a 15% restocking fee at our discretion. The charge for cancellation of orders is 20% at our discretion. No returns on software. We accept no responsibility for any false claims made by manufacturers. Prices quoted for stock on hand and subject to change without notice. Specialists in APO and international deliveries. Please add 5% (minimum \$5.00) for shipping. APO add to all prices 2% for shipping (minimum \$2.00). We calculate exact freight. Please allow 10 working days plus mail time (if an order is mailed in for receipt of all UPS delivered goods).

ALL BRANDS ARE REGISTERED TRADEMARKS

CIRCLE 126 ON READER SERVICE CARD

## Randomness, continued...

Use the quasi-random generator to supply a sequence of heads and tails, but provide an "option" button such that pressing the button inverts the decision of the quasi-random generator.

Then, starting from the same seed number, you can get different game histories, depending on when you press the option button. Working always with the same seed number, you might soon learn at which times in the game to press the button to succeed. This game would test your memory and your skill.

To make it a clean psychic game, you must start each time with a truly random seed number. Since you don't know the seed number and the subsequent quasi-random sequence, there is no systematic strategy for success. If you show in the long run a significant winning tendency, it can be due only to some psychic mechanism.

You could call the mechanism in this case *precognition*. You might foresee when the quasi-random generator is going to work against you, and then hold the option button down to invert the decision.

In the laboratory, precognition and PK appear closely related, and it is often impossible to distinguish one from the other. They are probably based on some common "psi principle," in which psi

includes PK, precognition, and the other forms of ESP.

### Design of Psychic Games

Should we modify available games or design new ones for the study of psi effects?

Some games may need little change. When the player has skillfully guided his

## *In the laboratory, precognition and PK appear closely related.*

missile toward the enemy ship, you can let a truly random cointoss determine whether the ship blows up or the missile is repelled.

In the end, you display next to the total score (resulting from skill, strategy, and chance), the psi score that reflects the player's "luck" in the game, i.e., his success with the chance decisions.

Challenging the player to display not only his skill and cleverness, but also his psychic powers may add a new dimension to the game. Even though the effects are small on the average, the correlation between your momentary

mental state and your psi score may be striking.

Most of the previous work has been done with very simple games in which skill and strategy play no part and in which we have only one thing upon which to concentrate. (A collection of ten such games for the Atari is available through the Mind Science Foundation, 102 W. Rector #215, San Antonio, TX 78216. Text and Basic listings, \$15; same with listings on disk, \$23. If you can feel challenged by simple games, they might give you the best opportunity to explore your own PK. You can live up the games with mental pictures and discover what mental state seems best for success.

Extremely fast games that strain your eyes and your hand muscles might not work quite as well on the psychic level, because you may be too distracted—but we don't really know. With some people the complete involvement in some skill task may carry a subconscious PK effect.

The real challenge for game designers might lie in setting the stage for a basically simple chance event. When the plane drops its bomb, let the bomb gather speed gradually and emit the eerie sound of the bomb, and then let a random event decide whether the bomb really explodes on impact. ☐

## BASF DISKS

LIFETIME GUARANTEE | HUB-RINGED | CERTIFIED ERROR FREE

SSDD

5¼"

DSDD

\$21.90 ea. — 1-9 Boxes — \$30.90 ea.

\$19.90 ea. — 10+ Boxes — \$28.90 ea.

FREE PLASTIC CASE  
WITH EACH BOX

- ☐ SEND ME YOUR PRICE LIST  
☐ SEND ME \_\_\_\_\_ BOXES AT \$ \_\_\_\_\_ PER BOX

ADD 3% SHIPPING/HANDLING (\$3.00 MINIMUM)  
TWO WEEK DELAY FOR PERSONAL CHECKS

- ☐ PAYMENT ENCLOSED \$ \_\_\_\_\_

(Texas residents add 5% sales tax.)

- ☐ CHARGE MY: ☐ MasterCard ☐ Visa

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_  
(please print full name)

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

214-644-2611



Software  
t'Boot

07C



2116 E. Arapaho #600  
Richardson, Tx 75081



## New Inmac Catalog jam-packed with computer/ wp supplies.



# Yours free!

Accurately called "the bible of the industry," it's loaded with great products and ideas for your personal computer, minicomputer or word-processing system. You'll enjoy:

- **One-stop shopping.** Over 2,000 products to choose from.
- **Easy ordering.** Mail, phone, or TWX. Verbal P.O.'s welcome.

- **Fast delivery.** 24-hour shipment. Overnight emergency shipments available.
- **45-day trial.** Full refund if not completely satisfied.

- **Guaranteed quality.** All products field-tested to highest standards.
- **Lower shipping costs.** 8 fully stocked distribution centers serving the U.S.

**For fastest delivery of your free 100-page Inmac catalog, call 1 (800) 547-5444. 1 (800) 547-5447 in California.**

**inmac**

Catalog Dept., 2465 Augustine Drive, Santa Clara, CA 95051  
Please be sure to include your phone number.

NAME \_\_\_\_\_ PHONE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

# Continuous CHECKS

for Desk-Top Computers  
as low as **\$29.95**

for 250 checks printed with  
your name and bank information

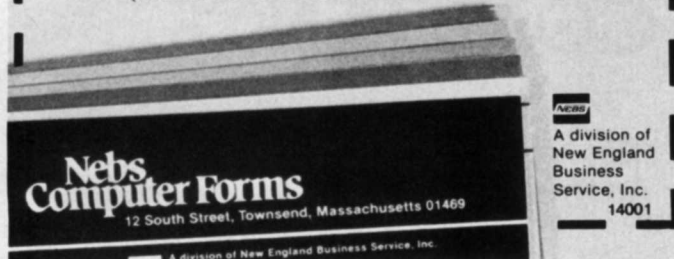
- Statements, invoices, other forms compatible with software from over 300 sources.
- Or program to NEBS standard forms yourself.
- Quality products in small quantities shipped direct to you. Fast service, low prices, money-back guarantee.

**FREE** one-stop catalog of computer forms, stationery, supplies and accessories.

Write or phone for your copy Today.

**TOLL FREE 1 + 800-225-9550**

(Mass. residents 1 + 800-922-8560)



**CIRCLE 162 ON READER SERVICE CARD**



## LEARN VISICALC™ SUPERCALC™ MULTIPLAN™ THE EASY WAY USING OUR TEMPLATES

First Load Visicalc, Supercalc, or Multiplan, then load the Template diskette and key in the numbers. You will enjoy the power of these spreadsheets instantly!

DO YOUR:

### ESTIMATING IN CONSTRUCTION Job Cost \$49.95

The Building Site • Preliminary Costs • Site Clearing, Excavation, & Fill • Footings • Foundation • Floor System • Super Structure • Roofing • Electrical, Plumbing, Heating & Air Conditioning • Brickwork • Energy Saving Materials • Interior Wall & Ceiling Finish • Exterior Trim • Concrete Floors, Walks, & Terrace • Interior Trim • Painting, Floor Covering & Appliances • Gutters, Onsite Improvements & Misc. • Overhead Contingency & Profit.

### ANALYSIS in FINANCE \$49.95

Break-Even Analysis • Cash Budget • Pro-Forma P & L • Pro-Forma Balance Sheet • Ratio Analysis • Depreciation Tables (5) • Net Present Values.

### PROJECTIONS in REAL ESTATE \$49.95

NIREB Forms: CID B — Property Analysis • CID C — Comparative Investment Analysis • CID D — Individual Tax Analysis • CID G — Excess Depreciation • Net Proceeds • CID I-A — Internal Rate of Return.

### BUDGETS for the HOME \$29.95

Personal Budget • Shopping List • Mortgage & Loan • Individual Retirement Account • IRS Schedule A.

Future Templates — Retailing • Energy Audit • Engineering • Statistics • Multi-Level Marketing • Office Management.

Specify which one: Apple II • TRS-80 I, II, III • IBM PC • Atari 400, 800 • Commodore • Osborne. Can't complete order without computer name!

orders only - 800 824 7888 Operator 583

INQUIRIES (714) 338-5075

COD OK — Credit Cards Welcome — Checks OK - Add \$3.00 shipping or handling, street address required. Calif. — add 6% sales tax.



## SOFTWARE MODELS

"The Template People"

P.O. Box 1029 • Crestline, CA 92325

**CIRCLE 283 ON READER SERVICE CARD**

# The Home Accountant™ It can cover your assets.

If you're concerned about your money, it's important to know not only where your assets are but whether they're working for you.

By tracking up to 200 different budget categories,\* 5 different checking accounts and all the credit cards you can carry, The Home Accountant will let you know where you stand on any given day. It will even print your checks, your net worth statements and financial statements.

Additionally, full-scale color graphics of actual vs. budgeted expenses give you an instant overview of your financial condition.

The Home Accountant can save you enough time and money to more than justify its cost. And the experts agree:

“Of the five [home financial] programs reviewed here THE HOME ACCOUNTANT is the most thorough and powerful. Considering how much it can do, it's remarkably easy to use.”

—Softalk, Apple, April, 1982.

“Personal-finance programs, have for the most part, a manual file system. Only THE HOME ACCOUNTANT is fully automatic.”

—Popular Science, December 1982.

“The program itself does just about everything you'd ask of a personal finance package.”

—Popular Computing, November, 1982.

## THE HOME ACCOUNTANT. The #1 bestselling personal finance program in the world.

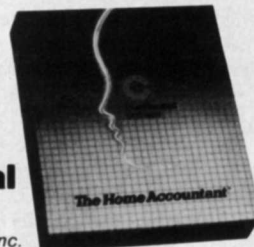
Available for: Apple II, IBM Personal Computer, Atari 400/800, Osborne, TRS-80 Model III, Commodore VIC 64.

\*Actual budget capacities will vary with each computer.



**Continental  
Software**

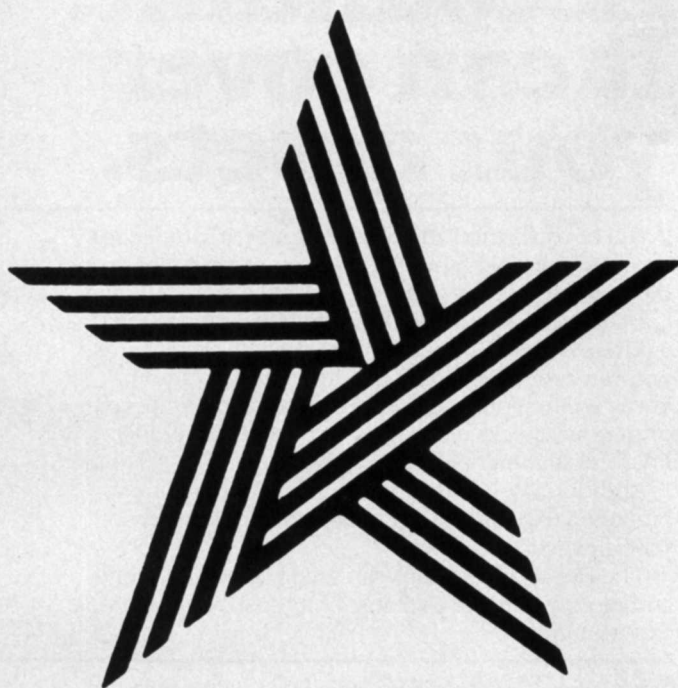
A Division of Arrays, Inc.



Continental Software, 11223 South Hindry Ave.  
Los Angeles, CA 90045, (213) 417-8031.

The Home Accountant is a registered trademark of Continental Software. Apple II is a registered trademark of Apple Computer, Inc. IBM Personal Computer is a registered trademark of IBM Corp. Atari 400/800 are registered trademarks of Atari, Inc., a division of Warner Communications, Inc. Osborne is a registered trademark of Osborne Computer Corp. TRS-80 Model III is a registered trademark of Tandy, Inc. Commodore VIC 64 is a registered trademark of Commodore Business Machines, Inc.

**CIRCLE 147 ON READER SERVICE CARD**



## 1983 NATIONAL COMPUTER CONFERENCE

**May 16-19  
Anaheim, California**

The National Computer Conference (NCC) is one of the largest, if not the largest, conference and trade show in the United States. Prior to the opening of NCC in Anaheim May 16-19, AFIPS officers were estimating attendance as high as 125,000.

There is no question that the number of attendees was enormous. When asked for a final total after the show, however, AFIPS officials refused to reveal one. We can only conclude that this means the attendance fell short of their published expectations—perhaps far short.

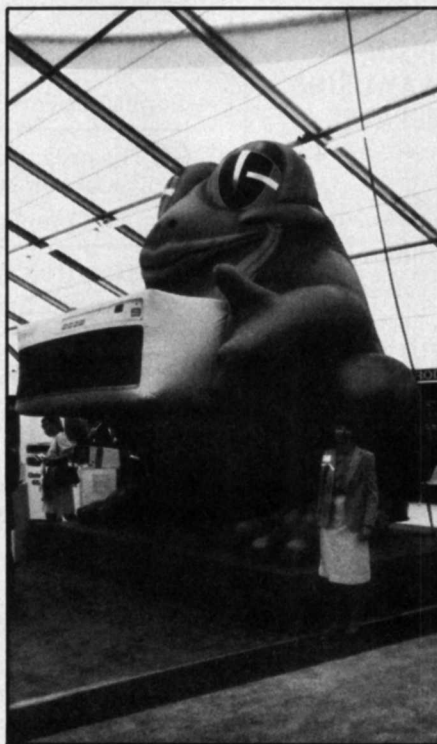
In addition to the staggering number of attendees, there were far more exhibitors than could be accommodated in the Anaheim Convention Center. As in past years, part of the overflow was housed in the Disneyland Hotel Convention Center and in the indoor garage one level below. Savvy convention-goers quickly learned that the best way between the two floors was through the restrooms; this convenient passage saved a 50-yard walk up an outside ramp.

In addition to the Disneyland Hotel, six temporary buildings were erected in the Convention Center parking lot. These Sprung Instant Structures were composed of aluminum frames covered with plasticized fabric. They were quickly dubbed the tents, and, despite large air conditioning units, proved to be heat collectors beyond compare. After high noon, only the hard-

---

**David H. Ahl**

---



*Editor Betsy Staples and friend.*

iest of attendees ventured into the tents for more than 10 or 15 minutes at a stretch. We had to pity the 635 exhibitors stuck there and pity their equipment even more.

In total, there were over 3200 exhibitors located in the nooks and crannies of the Convention Center, arena, hotel, and, of course, the tents.

NCC is a place for vendors to exhibit their latest wares. Because of its overwhelming size, few companies find it a good place to introduce brand new products—they just get lost in the shuffle. Of course, there are exceptions (IBM introduced their long-awaited System 36; NCR announced seven new processors in the V-8600 family; and several Japanese companies showed new products). On the other hand, NCC is often the first time many previously-introduced products are displayed in the flesh in public. Some of these products are described below.

But there is more to NCC than a trade show. It is, after all, a conference, and there are conference sessions to satisfy practically every taste and interest. A session on personal computers rehashed what we and the other magazines have been saying for years, namely that these machines are truly useful and have a place on practically every businessman's desk as well as in most homes. What a surprise!

Somewhat more of a surprise was the number of people interested in micro-to-mainframe links. The ultimate goal seems

to be some sort of virtual terminal built in to a microcomputer, but at the moment, most of the approaches are based on software. The reasons for such a link are many: It would allow a manager to download sales information on his brand or geographic location and analyze it with a spreadsheet program. It would also overcome some of the storage limitations of micros. While there were many networking products at NCC, most were designed to link up similar computers (North Net for NorthStar computers, Wang's Local Interconnect Option for their machines, Applenet, etc.). However, in the coming years, we expect to see more and more products like Ethernet designed to link dissimilar computers, and, more particularly, micro-to-mainframe links.

At another session, experts representing various fields of computing warned that the United States is likely to lose its position of prominence in the coming years. While consortia of high-technology companies are working feverishly in Britain and Europe, clearly the biggest threat to U.S. supremacy is Japan. According to experts in artificial intelligence, numerical computation, and defense systems, the long-term research program established by Japan's Ministry of International Trade and Industry (MITI) will make Japan the computing leader in the world by 1990.

MITI development projects now underway are focusing on artificial intelligence, computer-aided design, manufacturing, and large-scale numerical processing. According to Professor Edward Feigenbaum, an AI expert at Stanford, Japan is

focusing on areas of technology which will be the most pressing in the world ten years from now. In summary, this session was an ominous warning to U.S. education and industry.

John Imlay, chairman of Management Science America, gave the keynote address. He also mentioned the threat from Japan and called for a national policy to combat the "brain intensive" Japanese. In a far-ranging multi-media presentation, Imlay said that computer terminals will soon become extinct as they are replaced by personal computers with advanced soft-

***"It is more important  
that your son or  
daughter have a  
computer than an  
automobile."***

ware. He also cautiously supported the Apple Bill, while warning parents and educators of being outpaced by their computer literate children and students. On the other hand, he said, "It is more important that your son or daughter have a computer than an automobile."

As for Apple, they are not waiting for the Apple Bill to pass, and announced a program to donate a computer to every one of the more than 9000 public and private schools in California. The program

is called "Kids Can't Wait" and will be described in an upcoming issue.

NCC is also a place for awards and for honoring people of the industry. Wednesday was designated Pioneer Day and focused on the work of Howard Aiken (1900-1973) and his colleagues at the Harvard Computation Laboratory 40 years ago. In 1944, after five years of effort, the room-size Automatic Sequence Controlled Calculator was unveiled to solve naval navigation and ballistics problems. It was the first in a series of large-scale computing machines which came to be known as Mark I, II, III, and IV. While the Mark I was electromechanical, the Mark IV boasted diode logic circuits, magnetic core shift registers, and a drum storage unit.

Captain Grace Murray Hopper was one of the first people to learn how to program the Mark I, as well as the Mark II and III. She was also a key figure many years later in the development of the Cobol language. For this, as well as for her "continued support for high standards in computer education," Capt. Hopper was awarded the ACW Ada Augusta Lovelace Award for Excellence.

Also honoring a pioneer in computer education, AFIPS' first annual Education Award was presented to John Kemeny of Dartmouth College for his "visionary efforts in making computing universal for students of all disciplines." Kemeny was codeveloper with Tom Kurtz of the Basic language and the Dartmouth Timesharing System.

Other awards went to Dr. Gene Amdahl (developer of the IBM 360 architecture, and founder of Amdahl Corp. and Trilogy Systems) and Dr. Richard Tanaka, president of Systonetics, for his 19 years of service to AFIPS.

AFIPS, by the way, stands for the American Federation of Information Processing Societies. Member societies include the Association for Computing Machinery (ACM), Association for Educational Data Systems (AEDS), Data Processing Management Association (DPMA), Society for Computer Simulation, IEEE and six others.

#### **New Products at NCC**

Reinforcing the view that the Japanese are getting a lead in computing was the showing of the first production 256K memory chips by Fujitsu. The company announced that the chips will be incorporated into a new 8/16-bit microcomputer on a single plug-in board. This is part of the Micro 16 Personal Business Computer. With dual Z80 and 8086 processors, 1Mb of RAM, two double-sided double-density 8" floppy disk drives, and a 40Mb hard disk, the Micro 16 carries a retail price of only \$2495.

Before I get to the other new products and almost new products, I would like to



## NCC '83, continued...

nominate this announcement for our jargon of the issue award. **Kodak** announced an "Isomax floppy disk drive" capable of storing data in both a horizontal and vertical format. It employs "an isotropic cobalt-enhanced magnetic particle, which can record data at a variety of angles, ranging from the conventional horizontal format up to a vertical or perpendicular format." Jargon aside, this is a neat product as it is able to increase the amount of data stored on a 5-1/4" floppy disk from about 1Mb to 10Mb.

Speaking of packing density, **Sony** announced a 3-1/2" microfloppy drive that can store up to 1Mb of data. This is a double-sided, double-density unit with 80 tracks in contrast to the earlier 70-track design. Sony also announced a single-sided drive with 500K capacity.

Not to be outdone, **Tandon** also announced a 1Mb 3-1/2" drive, and we would expect other manufacturers to make similar announcements in the near future.

As you might have gathered, some of the most interesting new product announcements were from the Japanese companies.

Although many of the products will never reach these shores in quantity, the level of advancement of Japanese technology and quality has to be seen to be believed.

## Another nifty Japanese entry was the PC-5000 from Sharp.

**Sord** is one of the largest consumer electronics manufacturers in Japan, yet they have never been a factor in the U.S. market. From their new announcements, it looks as though that might change.

At the low end, they announced the M5 computer. This will be sold in two versions, the M5 Fun Computer and the M5 Multi-Computer. The Fun Computer is a cartridge plug-in unit for games only. The other model includes two versions of Basic, one for calculations and the other for graphics.

The compact M5 uses a Z80 mpu, has an 8K ROM with the operating system; 4K of RAM expandable to 32K; "Chiclet-style" keyboard; RS-232, cassette, and Centronics parallel ports; and two "joy-pads" (Intellivision-type game controllers). Basic price \$199.

The upscale M23 computer is available in two basic versions, portable and desktop. This Z80-based machine has 128K of memory and two disk drives in one of three sizes (3-1/2," 5-1/4," or 8").



*Sord M5 is a capable little computer for \$199.*



*Sord M23 uses PIPS III, a no-programming business planning system.*

It has exceptional graphics resolution (640 x 256 pixels) in eight colors.

The most intriguing aspect of the M23 is the software. In addition to Basic, the M23 runs PIPS, a no-programming business planning system. PIPS is similar to a spreadsheet calculator, but uses direct commands and requires no advance programming. The 43 interactive commands include MT (make table), SORT (sort data), and CT (change title). A basic M23 portable system retails for about \$2195.

**Toshiba**, another Japanese firm, also had several interesting entries. Most intriguing was a portable version of the T100 personal computer housed in an attache case. The basic unit is similar in size to an Epson HX-20 or Tandy Model 100, although the 40-character by 8-line LCD display is in a separate module from the computer itself.



*Toshiba Portable 100 has a detachable LCD display and modem.*

The T100 has 64K of memory built in; external non-volatile RAM packs are also available. List price on the portable T100 is \$795; the LCD display costs an additional \$295.

Toshiba also announced a major price reduction on the full-size T100 system with cpu, 64K, monochrome display, two double-sided double-density disk drives, CP/M, and a full range of software (word processing, spreadsheet, CBasic, TBasic and more). New price \$1995.

The top-of-the-line Toshiba T300 is a 16-bit machine that runs IBM PC software but is more than just a PC clone. Graphics resolution is a spectacular 650 x 500 addressable pixels in eight colors. A sleek,

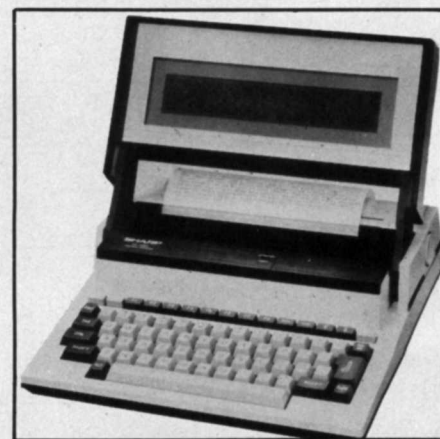


*Toshiba T300 runs IBM PC software but has spectacular high-resolution graphics.*

detachable keyboard, 192K of RAM, slim-type 640K floppy disk drives, and seven expansion slots round out the package. Base price is an attractive \$2495.

Another nifty Japanese entry was the PC-5000 from **Sharp**. This 11-pound portable unit operates on a rechargeable battery and uses a 16-bit 8088 mpu with 128K of memory, expandable to 256K.

In addition, 128K bubble memory cartridges are available for off-line mass stor-



*Sharp PC-5000 is a 16-bit portable with 128K, folding display, and optional printer.*

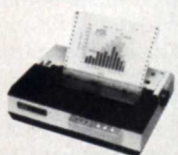
# OUR PRICES, SELECTION AND SAME-DAY SHIPPING MAKE US COMPETITIVE.

## OUR PEOPLE MAKE US EXPERTS.

**Red Baron. Home of the Nation's Largest Computer Printer Inventory.**

### NEC 8023/DMP 85

Quality and Performance

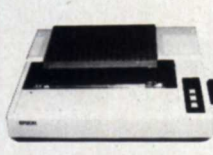


- 100 CPS
- 5 unique alphabets including Greek
- 8 character sizes
- Dot graphics
- Vertical and horizontal tabbing

NEC 8023/DMP 85 ..... **\$Call**

### The Epson Series

High-Quality Printers



- 100/160 CPS
- Dot graphics
- Proportional spacing
- Super/subscript
- Underlining
- Downloadable character sets

Epson FX series..... **\$Call**  
Epson RX-80 ..... **\$Call**

### Star Micronics

Gemini 10X/15



- 100 CPS
- 120 x 144 dot graphics
- 2.3 K buffer
- Underlining
- Super/subscript

Gemini 10X.....  
Gemini 15.....  
Star STX-80.....

**Lowest  
Priced  
Dot  
Matrix**

### The Okidata Series

Advanced, Multifunction Printing

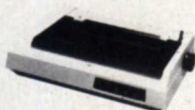


- 160/200 CPS
- Correspondence quality
- Okigraph dot graphics

Okidata 92.....List \$ 699  
Okidata 93 (w/Tractor)List \$1249  
Okidata 84 (Parallel).....List \$1395  
Pacemark 2410 .....List \$2995 **\$Call**

### IDS Microprism 480

Prints like a daisy, priced like a matrix!



- Correspondence quality in a single pass
- Dual speed 75, 110 CPS
- Proportional spacing
- Text justification

IDS Microprism 480 .....List \$799 **\$Call**

### IDS Prism

Affordable Color, High Speed



- 200 CPS
- 24 x 9 dot matrix
- Color graphics
- Text justification
- Proportional spacing

Prism 80 .....Base List \$1,299 **\$Call**  
Prism 132 .....Base List \$1,499 **\$Call**

### Apple® Boards

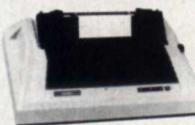
by Orange Micro

- 16K Buffer, upgradable to 32K or 64K
- All Standard Grappler + features, 23 Text and Graphics Commands in all
- Compatible with most popular dot matrix printers
- Automatic memory configuration, self test

Buffered Grappler + .....\$239  
Grappler + .....\$175  
Grappler + (IDS Color).....\$175  
The Bufferboard.....\$175  
Orange Board Parallel Interface .....\$ 87

### Anadex Silent Scribe

The Quiet Matrix Printer

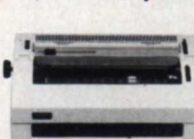


- Up to 500 CPS
- Industrial duty
- Correspondence quality printing
- Graphics

	List	Discount
Anadex DP-9501A.....	\$1,725	\$1,325
Anadex DP-9620A.....	\$1,845	\$1,475
Anadex 9625A.....	\$1,995	\$1,605
Anadex WP-6000(w/Tractor)	\$3,450	\$2,960

### Brother HR-1/DX-15

Perfect for quality word processing



- 15/16 CPS
- Bi-directional printing
- Quiet, efficient operation for word processing

Brother HR-1 .....List \$1150 **\$Call**  
Brother DX-15 .....List \$ 599 **\$Call**

### TeleVideo CRT's

Price, Performance and Reliability



TeleVideo knows top value means top features at a low price!

	List	Discount
910.....	\$ 699	\$575
925.....	\$ 995	\$730
950.....	\$1195	\$945
970.....	\$1495	\$Call

### Cables and Accessories

Custom Printer Cables for Apple, Atari, IBM, TRS-80 and MORE!.....**\$Call**  
CCS Apple Serial Interface and Cable.....\$150  
Complete Stock of Epson Accessories.....**\$Call**  
Printer Stands: Large.....\$ 99  
Small.....\$ 25  
Printer Ribbons—Most Types.....**\$Call**  
Signalman Modem.....**\$Call**  
Hayes Micromodem II.....\$300

### Other Quality Products

at Red Baron

Printers	List	Discount
NEC Spinwriter RO		
Serial Parallel 7710.....	\$3055	\$2500
Serial 3510.....	\$1895	\$1640
Smith-Corona TP-1.....	\$ 895	\$Call
<b>Monitors</b>		
Amdek Video 300.....	List \$ 249	\$160
Amdek Color 1.....	List \$ 499	\$355
<b>Diskettes</b>		
Verbatim Diskettes.....	\$ 29	
Color Coder Diskette Cases.....	\$ 16	

### Here's How To Order:

Phone orders are welcome; same-day shipment on orders placed before 11:00 a.m. Free use of MasterCard and Visa. COD's accepted. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision. APO/FPO Orders Welcome.

We accept NET 10 purchase orders from Fortune 1000 companies, educational and government institutions. Call for shipping information.

**Write for Free Catalog**

**Red Baron**  
COMPUTER PRODUCTS

4501 E. Eisenhower Cir., Anaheim, CA 92807

National Order Desk:

**(800) 854-8275**

Product Information/  
Order Inquiries:

**(714) 779-2779**



age and applications software.

The LCD display panel folds flat against the PC-5000 for carrying. In use, it displays 8 lines of 80 characters with bit mapped graphics capability (640 x 80 pixels).

An optional printer adds to the versatility of the PC-5000. The printer will print on either thermal paper or plain paper with a carbon ribbon. It prints 80 characters per line, 10 or 12 pitch, at 37 characters per second.

Projected price of the computer is \$2500; no price on the printer yet.

**Sanyo** was showing their range of small business computers. The low-end MBC 1000 is built around a Z80 mpu and has 64K and an extended version of Microsoft Basic, dubbed SBasicII. The unit is also said to support CP/M. A 12" monochrome screen and single 5-1/4" floppy disk drive are built in.

The MBC 1200 has a similar appearance to the 1000, but has dual Z80 mpus so there is rarely a wait mode. The computer is designed for high resolution graphics and has a 640 x 400 pixel monochrome display along with two double-sided, double-density disk drives.

The up-scale MBC 4000 is a 16-bit unit built around the 8086 mpu. It has 128K of memory, expandable to 512K. The software, including Basic and Goal (a spreadsheet), operates under CP/M-86.

In the April issue of *Creative Computing* we had a sneak preview of a Commodore 64 in a compact case. This is now officially designated the Commodore Executive 64 and is shipping in limited quantities. It has 64K of memory, a detachable keyboard, 5" color monitor, and a built-in 170K



*Commodore Executive 64 has 64K, 5" color display, and is two-thirds the size of an Osborne.*

floppy disk drive with an option for a second drive. The size is a diminutive 5" x 14-1/2" x 14-1/2". Price is \$995 with one disk drive, \$1195 with two.

**Commodore** was also showing a pair of new streamlined computers, the B128-80 and BX256-80. The B model uses a 6509 mpu (6502 compatible) with 128K of memory (expandable to 256K), has an 80-character x 25-line display, ten function keys,

numeric keypad, RS-232 port, IEEE-488 bus port (Commodore does not support the Centronics parallel protocol), and 8-bit user port (whatever that is). Price \$995.



*Commodore BX256-80 has dual 8- and 16-bit mpus, 256K, detachable keyboard, and room for two disk drives.*

Initially, the BX model appears similar to the B model. But there are more differences than similarities. The BX case has a swivel-and-tilt CRT display mounted on it and is designed to accept one or two floppy disk drives. Also, the keyboard is detachable. Internally, the BX model has dual processors, an 8-bit 6509 and a 16-bit 8088, along with 256K of memory. I/O is the same as the B model, and both speak Basic 4.0, a proprietary Commodore version. Don't expect immediate delivery; as of NCC, the engineers had been unable to fit any disk drives into the space allowed in the sleek case. Price \$2995.

**Lobo Systems** were showing their Max-80, a direct-sold computer with a hard-to-beat price of \$945. The Max-80 uses a Z80B mpu at a 5MHz clock rate (that's 2-1/2 times faster than most Z80 machines). It has 128K, floppy and Winchester disk interfaces, two RS-232 ports, a Centronics port, built-in clock with battery backup, 24-line x 80-character display, and full



*Max-80 from Lobo Systems has 128K and lots of extras for only \$945.*

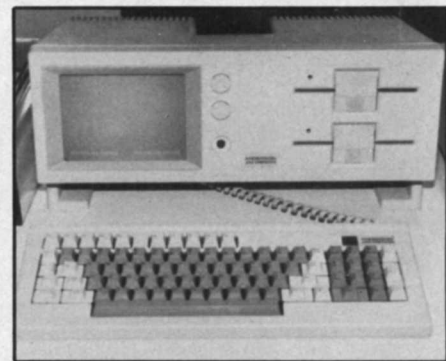
keyboard with numeric keypad.

A dual 5-1/4" double-density, double-sided disk drive (690K total) is priced at just \$695. A 1.4Mb unit is priced at \$895.

In addition, the Max-80 comes with CP/M Plus, an enhanced version of CP/M 2.2. Also available for an extra \$69 is LDOS which allows the unit to run most TRS-80 Model III software. All in all, I was most impressed with this system!

**Eagle** was showing three lines of computers, the 8-bit (Z80A) IIE series, the 16-bit (8088) PC series, and the 16-bit (8086) 1600 series. The PC series is (surprise!) compatible with the IBM PC in both software and hardware. With *Eaglewriter* and *Eaglecalc*, it seems to have some pluses in the software department. The price is right: \$1995 for a 64K unit with one disk drive, although the \$2995 configuration with 128K, monitor, and software packages is likely to be more useful. Be sure to watch for a complete, in-depth evaluation of the Eagle PC on these pages in the near future.

In the IBM act-alike department, **Anderson Jacobson** introduced the AJ Passport with 256K, one or two disk drives, serial and parallel ports, built-in 300-baud modem, 640 x 250 pixel display, and built-in clock with battery backup. Unlike the IBM PC, the Passport is exceptionally compact (18.3" x 11.3" x 8.8") and has a built-in 7" amber display screen. Layout of the keyboard is more sensible than the PC



*Anderson Jacobson Passport is a snazzy IBM PC clone with some nice additional features.*

with the menu for the ten function keys appearing on the bottom line of the display. A single-drive system with software bundled in is priced "in the low \$3000 range."

**Computer Devices**, a 14-year-old maker of portable terminals, was showing their Dot computer. This is a compact unit with 16-bit 8088 mpu, 128K of memory (expandable to 704K), dual Sony 3-1/2" floppy disk drives, integrated 9" monitor (green or amber) with an astounding 1056 x 254 pixel resolution, 300-baud modem, two RS-232 ports, clock with battery backup, and a built-in thermal printer.

- ◁ indicates price decrease  
● indicates new item

## COMPUTERS

Apple II-E STARTER SYSTEM	\$1715◁
Chameleon, Columbia, Compac	Our staff knows!!
Franklin ACE 1000 with color	\$985●
Franklin ACE 1200 - 1 drive, 80 column, Z-80, software	\$1735
IBM PC	Complete systems start at \$2650
Kaypro II w/Software	\$1595◁
Kaypro II + - 400K drives	\$1875
NEC APC HO2 - green/2 drives	\$3050◁
NEC APC HO3 - color/2 drives	\$3750◁
Osborne Double Density	\$1735◁
Slimline S-100: Z-80, CP/M, 64K, 2 MByte drives	Under \$2000
Syscom II - Apple II Plus Emulator - not a #@! kit	\$595◁

## PRINTERS

Epson MX-80FT Type III - STILL AVAILABLE	\$505
Epson MX-100 - w/Graphtrax	\$685
Epson FX-80 - 160cps, friction, sprocket	\$565
Brother HR-1A 17cps daisywheel, enhanced	\$715◁
F-10 Starwriter - 40cps. Diablo codes	\$1195◁
Graphic Printer - 50cps, 5 x 7 matrix, sprocket	\$199◁
Mannesmann-Tally 160L - uses Daisy software	\$775◁
NEC 3550	\$1965
NEC 7730	\$2145
Okidata - uses standard spool type ribbons	
u82A - serial/parallel/friction/sprocket	\$405◁
u84AP - 200cps, 132 column, parallel	\$955
u92 - 160cps, 80 column, parallel	\$95◁
u93 - 160cps, wide	\$895◁
Prowriter (C. Itoh 8510A) - 120cps, proportional	\$372◁
Prowriter II (C. Itoh 1550A) - wide carriage	\$665◁
Gemini 10 - 80 column, 100cps	\$325◁
Gemini 15 - 15" wide	\$455◁
Toshiba #1350 - top of the line dot matrix	\$1555◁

## VIDEO MONITORS

Amdek 300G	\$142◁
Amdek 300A	\$165
Amdek 310G - for IBM monochrome adaptor	\$175
Amdek 310A - amber for IBM	\$185
Amdek Color I - 13" color composite	\$294◁
BMC 12" Green - not fancy, but it works	\$94
BMC 13" Color - composite	\$294◁
BMC 13" RGB with card for Apple II +	\$395
Dynax 12" Green (GM-120) - BEST BUY	\$129
Dynax 12" Amber (AM-121) - 970 line resolution!	\$145
IBM MONOCHROME green	\$345
Princeton Graphics HX-12 RGB for PC	\$485◁
Taxan VISION-III - hi-res for IBM & II-E	\$533◁

## FOR APPLE & FRANKLIN

Advanced Logic Systems - high performance/low price	
CP/M Card - 2/64K, CP/M 3.0	\$290◁
Z-Card II - list \$169	\$135
Smartterm II - list \$179	\$145
dBase II (requires CP/M)	\$419◁
Davong 10 MByte hard disk - BEST BUY	\$1695◁
Davong 18MByte tape backup	\$1465●
Dumpling GX - like Grappler +	\$105◁
Dumpling 16K - graphics and buffer, expandable	\$160◁
Grappler +	\$125◁
Hayes Micromodem II	\$275
Hayes Micromodem II with Terminal Program	\$295
Magic Window/Word/Calc software pkg	\$235
Microsoft MULTIPLAN	\$192●
Rana Elite One - YES, it works	\$265◁
Rana Elite One Plus - with controller	\$355◁
Rana Elite Two - double storage	\$435◁
Rana Elite Three - quad storage	\$555◁
Serial Interface	\$105
SSM Modemcard w/SOURCE	\$285
SuperCalc	\$155
VISTA QUARTET (2 drives, thin, 640K, controller)	\$615
Vista V-1200, 6MB removable cartridge system	\$1225
Wordstar	\$185

## MODEMS

Hayes Smartmodem 300	\$215
Hayes Smartmodem 1200 - outsells the rest	\$515◁
Novation J-CAT	\$110●
Novation 103/212 SMART (direct connect)	\$385●
Novation 103 SMART (direct connect)	\$179●
RIXON R212A - 300/1200 SMART	\$365●

# 64K RAM SETS

9 CHIPS, FOR IBM

\$50

## PROWRITER

#8510A PRINTER

\$372

PC

64K/320K DRIVE

\$1975

XT

\$4750

**Some lead. Some don't.  
Some lurk in the shadows  
of "CALL" and "we'll beat  
any price." Being leaders,  
we've expanded our  
custom order handling,  
trained more technicians,  
and doubled and tripled  
inventory levels on  
popular items.  
Comparisons are  
welcome.**

## TELEVIDEO TERMINALS

TV-910-Plus	\$565
TV-910	\$565
TV-925	\$725
TV-950	\$915
TV-970	\$1095

Verify prices by phone. Add 2 1/2% for Visa or Mastercard.  
Add 6% on California orders. Orders prepaid with  
check, cashiers check, money order or wire transfer are  
shipped prepaid within the Continental U.S. COD's  
require 10% non-refundable deposit (re-stocking fee).

# IRONSIDES COMPUTER CORP



**Customer Service—  
Product Selection Advice  
(213) 344-3563  
ORDERS (800) 528-9537  
18905 Sherman Way  
Reseda, CA 91355**

Visit our new, enlarged showroom.

## NEC APC

Advanced Personal Computer

We have the lowest price because we sell the most. Or do we sell  
the most because we have the lowest price?

## FOR IBM PC

AST I/O + II Serial, Game, Clock	\$149●
AST ComboPlus with 64K, serial, parallel, clock	\$257◁
AST MegaPlus 64K, serial, parallel, clock	\$292◁
AST MegaPak 256K for MegaPlus	\$245◁
Davong 10MByte Hard Disk	\$1735◁
Davong 18MByte TAPE (PC or XT)	\$1650●
dBase II - for PC-DOS	\$429
Lotus 1-2-3	\$335
Keytronics keyboard	\$195◁
RAM SETS (64K with parity) - EXPANDS ALL IBM	\$50◁
RIXON PC212A MODEM	\$375●
Tandon TM100-2	\$245◁
Tandon TM100-4 - with DOS-FIX	\$335
TEAC 320K Half-Height	\$285

## FOR ATARI

Printer Cable	\$35
Rana Elite 1000 - single/double density floppy	\$385●
Serial Cable	\$35

## S-100 THINLINE COMPUTER SYSTEM

• Sierra Data Master (Z-80 4MHz, 64K, 2 Serial, Parallel, CP/M)	
• 2 Thinline 8" drives, 2MByte + 6 slot mainframe, 12" x 19" x 10" high	
• Add any standard video terminal and printer	
COMPUTER	\$1955
Mainframe only	\$450

## SIERRA DATA SCIENCES

Z-80 4MHz Master (64K/2 serial/floppy controller/hard disk port - SBC-100)	\$655
Z-80 4MHz Slave (2 serial/2 parallel/64K/EPROM programmer) - SBC-100S	\$655
CP/M for Master with BIOS - CPM/BIOS	\$150
Turbo-Dos for Master with Slaves - TURBO-DOS	\$645

## FOR COMMODORE 64

DATA 20 VideoPak80 - 80 column display	\$165
Z-80 VideoPak - CP/M and 80 column	\$275
Serial to Parallel Printer Cable	\$75

## CORONA DATA SYSTEMS

Systems include half-height 320K drives, 128K RAM expandable to 512K on-board, 640 x 325 graphics, green monitor with 16 x 13 matrix characters, serial port, parallel port, DOS, Basic, and spreadsheet software.	
PC-11 drive - list \$2595	\$2095
PC-22 drives - list \$2995	\$2375
PC-HD 10MByte hard disk - list \$4495	\$3495
PPC-1 Portable/1 drive - list \$2395	\$1950
PPC-2 Portable/2 drives - list \$2795	\$2250

## WABASH DISKETTES

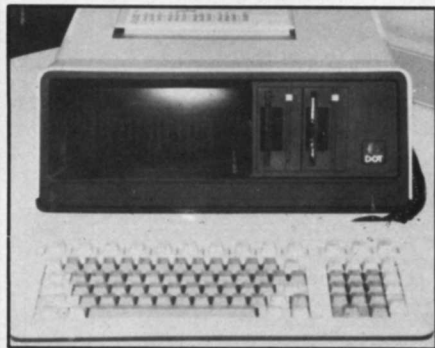
Single Side Single Density	5 boxes at \$17.50/box
Single Side Double Density	5 boxes at \$21/box
Double Side Double Density	5 boxes at \$32/box

## Chameleon "The Compatible Computer"

LOCAL SALES ONLY  
\$1995

## FOR OSBORNE

Corvus 6MB hard disk	\$1975
OSMOS 1 - double density mod	\$175
OSMOS 2 - 370K drives - compatible with software	\$855
OSMOS 3 - 750K drives	\$999
OSMOS 4 - Disk Format/Convert - read/write 20 formats	\$215
OSMOS 5 - 80 Column - select 52/80 display	\$235
OSMOS 6 - Drive Diagnostics	\$29



*Dot computer from Computer Devices uses 3-1/2" floppy disks, has a 16-bit mpu, 128K, and high-resolution display.*

Computer Devices has been busy lining up software firms to write packages for the Dot and already offers MS DOS and all the Microsoft languages, *Multiplan*, the *Datamension Manager* series of packages, *Volkswriter* from Lifetree, and accounting and database packages from both Timberline and Pearl. Not bad at all for \$2995 (single drive). The printer costs another \$599, modem \$225, and software packages \$175 and up. Watch for a review on these pages.

More than a small surprise were the Decision Mate V small business computers from NCR. Both 8-bit (Z80) and combined 8/16-bit (Z80 and 8088) versions are available with very high resolution monochrome and color displays. The 8-bit only model is priced at \$2650 and the 8/16-bit one at \$3440. With luck, you'll see a review soon.



*NCR Decision Mate computer comes with either 8-bit or combined 8/16-bit mpus.*

Another mainframe maker, **Honeywell**, also introduced a "low-end" desktop unit. The microSystem 6/10 is software compatible with the large Honeywell DPS 6 computer family and thus is off to a running start with scores of software packages. The 6/10 has dual processors (Honeywell LSI 6 and 8086), 128K, dual 5-1/4" floppy disk drives, swivel display, detachable keyboard, and the expected I/O ports. Base price is \$3995.

If you have \$3995 to spend and would rather have a portable unit, consider the



*Honeywell microSystem 6/10 is compatible with larger Honeywell systems so much software is already available.*

**Gavilan** mobile computer. This is a notebook-size unit (11.4" x 11.4" x 2.7") with a 16-bit 8088 mpu, 80K of memory, 3" micro-floppy disk, RS-232 interface, 300 baud modem, and full-stroke keyboard. That's for starters. It also has an LCD display (8 lines x 66 characters) with a Lisa-like (*VisiOn*-like?) software system of windows, files, menus, and interactive prompts. To select what you want to do, a 3.5" x 1.4" solid state touch pad is mounted above



*Gavilan Mobile Computer is completely portable, has 16-bit mpu, 3" floppy disk, LCD display, touch pad, and optional printer.*

the keyboard; your finger takes the place of the mouse on Lisa.

Software comes in small plug-in cartridges and includes word processing, a spreadsheet, communications package, and forms processing package. All this is powered by a rechargeable battery pack.

Gavilan also announced a portable 50 character-per-second correspondence quality printer powered by its own built-in battery pack. The printer costs an extra \$985. Delivery is supposed to start in October. We can't wait.

#### Names and Addresses

For more information on any of the products mentioned in this NCC roundup, write directly to the company at the addresses listed below (please mention *Creative Computing*) or circle the designated number on the Reader Service card bound in the back of the magazine. □

#### Reader Service Name and Address

- |     |   |
|-----|---|
| 405 | Anderson Jacobson, Inc.<br>521 Charcot Ave.<br>San Jose, CA 95131                                 |
| 406 | Commodore Business Machines<br>1200 Wilson Rd.<br>Westchester, PA 19380                           |
| 407 | Computer Devices<br>25 North Ave.<br>Burlington, MA 01803   |
| 408 | Eagle Computer<br>983 University Ave.<br>Los Gatos, CA 95030                                      |
| 409 | Eastman Kodak Co.<br>343 State St.<br>Rochester, NY 14650   |
| 410 | Fujitsu Ltd.<br>680 Fifth Ave.<br>New York, NY 10019  |
| 411 | Gavilan Computer Corp.<br>P.O. Box 5004<br>Campbell, CA 95008                                     |
| 412 | Honeywell, Inc.<br>200 Smith St.<br>Waltham, MA 02154   |
| 413 | Lobo Systems, Inc.<br>358 S. Fairview Ave.<br>Goleta, CA 93117                                    |
| 414 | NCR Corp.<br>1700 S. Patterson Blvd.<br>Dayton, OH 45479  |
| 415 | Sanyo Business Systems Corp.<br>51 Joseph St.<br>Moonachie, NJ 07074                              |
| 416 | Sharp Electronic Corp.<br>10 Sharp Plaza<br>P.O. Box 588<br>Paramus, NJ 07652                     |
| 417 | Sony Communications<br>Products Co.<br>Sony Drive<br>Park Ridge, NJ 07656                         |
| 418 | Sord Computer of America, Inc.<br>c/o Mitsui (U.S.A.) Inc.<br>200 Park Ave.<br>New York, NY 10166 |
| 419 | Tandon Corporation<br>20320 Prairie St.<br>Chatsworth, CA 91311                                   |
| 420 | Toshiba America, Inc.<br>2441 Michelle Dr.<br>Tustin, CA 92680                                    |

# Apple 128K RAM Card Sale

**Legend.....\$599\***

**Saturn.....\$599\***

**Alpha Byte...\$299!!**

\*Manufacturers' suggested list price

Alpha Byte's new 128K card for the Apple II, Apple II+, and Apple IIe is now available at this special low price — compare! It comes fully-populated with 128K bytes of RAM and can be configured to execute any software written to run with Saturn Systems' or Legend Industries' 128K RAM cards. Visicalc™ expansion and disk emulation software are standard and the board comes with a full 2 year no hassle warranty.

**Alpha  
Byte**  
**COMPUTER  
PRODUCTS**

31304 Via Colinas  
WESTLAKE VILLAGE, CA 91362

**To order or for  
information call**

**In Chicago:**

**(312) 454-1236**

**In New York:**

**(212) 509-1923**

**In Los Angeles:**

**(213) 706-0333**

**In Dallas:**

**(214) 744-4251**

**By Modem:**

**(213) 991-1604**

We accept VISA, MasterCard or C.O.D. (add \$3 for C.O.D.). Add a \$3 shipping charge to prepaid orders; actual shipping charges will be added to non-prepays. California residents, add appropriate sales tax.

**CIRCLE 287 ON READER SERVICE CARD**

# CP/M '83

---

## **Ken Uston**

---

The CP/M '83 Show in the beautiful City By The Bay, San Francisco, was a crashing success. More than 600 companies exhibited, and the show was seen by an estimated 80,000 attendees from all over the world.

CP/M, of course, is the operating system developed by Digital Research, Inc., Pacific Grove, CA, the sponsors of the show. About 5000 companies produce CP/M compatible software for more than 650 computers that run the system.

Exhibitors included Digital Equipment Corporation (the world's second largest computer manufacturer) and other hardware producers such as Radio Shack, Franklin, NCR, and Sanyo. Software companies such as Datamost, Hayden and VisiCorp also showed their wares.

There were vendors who sold merchandise right on the floor. There was even a little San Francisco bookstore that has metamorphosed into a software training center and hardware dealer.

### **Radio Shack Model 12**

Radio Shack teased us all with a big picture in a double page ad in the show program with a big picture of a computer under a black hood ("still under wraps"). At the show, they unveiled their mystery computer. It was the TRS-80 Model 12, which Radio Shack heralded as "the first of six new computer announcements" (I tried to find out



*The Radio Shack Model 12.*

about the other five, but none of the Radio Shack people admitted to knowing what they were. I suppose, in retrospect, that two of them were the Model 4 and the Model 100).

The Model 12 has a Z80A 8-bit processor, 80K RAM, and an 82-key keyboard with eight special function keys. It is compatible with TRS-80 Model II software and can also be upgraded to "true 16/32 bit processing" with a Model 16 Upgrade Kit.

A company representative told me that Radio Shack had received much criticism about the drab colors of their other computers. To correct this, the Model 12 is contained in an attractive

white case. The computer can have one or two built-in 1.25 Mb disk drives and lists at \$3199 (one disk drive) or \$3999 (two disk drives).

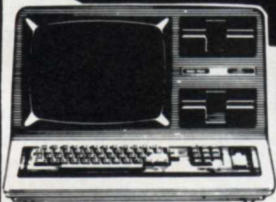
### **Franklin Ace 1200**

Franklin came out with yet another Apple look-alike. They held their first operating showing of the Franklin Ace 1200 (a preliminary "prototype," mostly a keyboard and case, was shown at Comdex in November, 1982).

The 1200 has an 8-bit processor, 128K RAM (using bank selection), color capability, upper- and lowercase, and a numeric keypad. It can handle any programs that run on the Apple II without

# TRS-80 COMPUTERS

ALL PURE RADIO SHACK EQUIPMENT



## DISCOUNT 15% AND UP

- COMPUTERS
  - PRINTERS
  - ACCESSORIES
  - GAMES
- CALL FOR OUR COMPETITIVE PRICES ON OTHER MAJOR BRANDS**

ALL TRS-80 MODELS

**FREE** PLEASE WRITE AND REQUEST . . .

- CUSTOMER DISCOUNT PRICE LIST
- MANUFACTURE WARRANTIES

© TRS-80 TANDY CORPORATION

## PERRY COMPUTERS

Dept. No. H-8 137 NORTH MAIN ST., PERRY, MI 48872

**FOR ORDERS CALL 1-800-248-3823**

FOR INFORMATION CALL (517) 625-4161

CIRCLE 173 ON READER SERVICE CARD

## PROGRAMS FOR A BUCK?

Apple II Plus / Apple IIe  
Atari 400, Vic 20, TI-99/4A, Timex/Sinclair

**PROGRAM OF THE MONTH CLUB**  
Each month, receive a disk or tape with 6-9 ready to run programs.

Over 90 programs per year.

Cost is less than \$1 per program

Games • Tutorial • Home Management • Utilities

	Tape	Disk
12 Months	\$90.00	\$95.00
6 Months	\$50.00	\$55.00
Single Issue —	\$15.00	

### Program of the Month Club

339 Bonney Street, New Bedford, MA 02744  
(617) 997-4177

Atari, Vic 20, TI-99/4A, Apple II are trademarks of  
Atari, Inc., Commodore International, Inc., Texas Instruments,  
Apple Computer, Inc. respectively

CIRCLE 198 ON READER SERVICE CARD

## How you can learn which software will best meet your needs.

Software Pro has separate user-friendly catalogs for Atari, Apple II, TRS-80-II, III, and IBM personal computers, featuring: program descriptions, updates at least twice a year, and detailed operating information. Operating system/microprocessor information is included to minimize the possibility of incompatibility. A marketing history is also provided so you can easily compare SW options.



### SOFTWARE PRO CATALOG ORDER FORM

PERSONAL COMPUTER	QUANTITY x PRICE	=	TOTAL	
<input type="checkbox"/> ATARI	_____ \$15.95	=	_____	Name _____
<input type="checkbox"/> IBM	_____ \$15.95	=	_____	Address _____
<input type="checkbox"/> APPLE II	_____ \$15.95	=	_____	_____
<input type="checkbox"/> TRS-80-II,III	_____ \$15.95	=	_____	_____ Zip _____

Please add 10% for shipping/handling →  
Tax included in price:

TOTAL  →

PAYMENT ENCLOSED ☐ CHECK ☐ MONEY ORDER

CLIP AND MAIL TO:

## SoftwarePro INC.

P.O. Box 62306, Sunnyvale, CA 94088 • (408) 947-4631

Contact us for release of our data base  
of thousands of SW producers.

**The first, most complete  
choice in software  
catalogs.**

CIRCLE 197 ON READER SERVICE CARD



*The Franklin Ace 1200.*

modification. For a list price of \$2195, we also get a built-in floppy disk drive (143K capacity) and controller, a CP/M card, and an 80-column card.

#### **NCR Decision Mate And Network**

NCR announced two products, a personal computer called NCR Decision Mate and a computer network system, the Decision Mate V Network.

Decision Mate is an 8-bit 64K unit, with two double-density 5 $\frac{1}{4}$ " disk drives with .5 Mb (unformatted) capacity. The detachable keyboard has 20 function keys and a numeric keypad. The basic computer lists for \$2650 (\$3100 with the 8088 16-bit processor add-on).

The Decision Mate V Network allows the networking of the NCR computer as well as IBM PC or Apple computers. Individual computers are tied into a central computer and can access data or programs in a central storage device. The system also allows print spooling (data is spooled to disk and stacked up in a job queue for processing by a central printer).

#### **Robot Redford**

A computer show wouldn't be complete without a robot, and CP/M '83 was no exception. Roaming around the aisles, embarrassing women and exchanging repartee with gregarious businessmen and computer hackers was Robot Redford. Mr. Redford, who didn't look quite like his namesake, was complete with red, white and blue baseball hat, a built-in TV to show us what we look like on the screen, and a computer keyboard.

The robot is a product of Superior Robotics of America, whose president, Bill Bakalienikoff, told me that the robot goes to about 50 shows a year. If you happen to be interested in having a

Redford of your very own, he will set you back \$1200 per day for one day (\$800 a day for three days), and he comes complete with two (human) operators. Expenses, of course, are extra.

#### **Perfect T-Shirts**

Perfect Software added to the variety of the show with a giveaway and contest drawing. They handed out 4000 "Perfect" T-shirts. Each day a drawing was held among the thousands who filled out forms (not a bad way to get a mailing list cheap, I would guess), and one computer was given away daily—a KayPro II, Access Matrix and Basis 108. At 5:00 p.m. on the final day, 50 names were drawn, and the winners were given copies of *Perfect Writer* and *Perfect Speller*, a package with a list price of \$695.

#### **VisiOn**

One of the most interesting demonstrations was by VisiCorp, who showed their new VisiOn package. The VisiOn "operating environment" allows a variety of software applications to take place simultaneously. VisiOn is designed to re-create the user's desk top on the computer screen, and I think they have accomplished their purpose.

The demonstration was impressive. We saw several spreadsheets on the screen at the same time; they were consolidated into a total spreadsheet by the touch of a key. The sheets overlapped just as they would if stacked on our desks, and we could call any one we wanted to the top of the pile. A pointing device called a "mouse" directs the cursor on the screen by being moved on any flat surface. The mouse directs the computer by pointing either to commands at the bottom of the screen or to specific data within one of the spreadsheets. (Other mice were also

shown at the show. Yes, one from TeleVideo was called Supermouse).

We were shown how data contained in the spreadsheets could be instantaneously plotted onto bar charts. The mouse can be used to make any of the sheets or "windows" any size and locate them virtually anywhere on the screen.

The system demonstration had VisiCorp's word processing program, *Visiword*, built-in. This made it possible to include charts or tables in the body of a document. Thus a user may write a report and incorporate the necessary statistical tables or charts as he progresses.

The package will be for the IBM Personal Computer. VisiCorp also has an agreement with Digital Equipment Corporation to make VisiOn available for their computers, but apparently some details have yet to be worked out between the two companies.

#### **Everybody's Gettin' Into The Act**

Columbus Discount Books displayed racks of computer books and software. Their president, Gary Pallister, took over this 25-year-old book company located in the heart of the San Francisco North Beach area (diagonally across from Carol Doda's infamous topless night club). He gradually converted the emphasis of the store to computer books. Then he added software to the line, everything from *Word Star* to *SuperCalc*, and the store was converted into a software training center. Victor 9000 computers are used, and Columbus Discount Books will become further entrenched in the industry by becoming a dealer for Victor computers. Who says the Era of Electronics isn't here?

#### **The Father of CP/M**

Among the many presentations at the show was a talk about CP/M by its founder (and president of Digital Research), Gary Kildall. His speech was given in a room which seated 2500. The room overflowed with people, so Gary gave the presentation a second time. Yup, the room was totally packed again.

I didn't hear the talk, but was told it was quite informative. Cassette tapes of the speech are available (although much of its effectiveness may be lost on tape since so many visual aids were used).

#### **Digital Research**

Digital Research made ten announcements at the show. One of the most significant was the introduction of an enhanced version of CP/M 86 for the IBM PC. (Digital produced the original CP/M 86 and sold the rights to IBM.) The new version includes a printer spooler capability and GSX, a feature that permits improved graphics. The

package will be marketed through Digital's dealers and will compete with the original system.

Digital also announced PL/I-86, a 16-bit version of their PL/I compiler, and CB86, a 16-bit rendition of their CBasic compiler (called CB80).

### Try It, You'll Like It

A company called Softlink introduced a concept called Softlok. Softlok allows users to try software packages, paying \$40 rather than the full price. A vital function of the software is "locked up" (for example, the store-to-disk capability), preventing its full use. If the user decides he likes the program, he goes to the dealer and pays the balance. The dealer calls Softlink, and gets a "keycode," with which the user may unlock his piece of software.

Apparently this encryption process has some validity in the eyes of the venture capitalists. Softlink announced more than \$1.5 million in funding from U.S. Venture Partners and Rothschild, Inc.

### Preventing Piracy

Urban Pacific Data Service came out with Prolock, which they say will "all but eliminate piracy." Here's how it works. Software producers and others buy

Prolock disks, which have a built-in fingerprint, that is, a series of random program encryptions "and other devious programming techniques," which protect the program.

The final user may make back-up copies of his master, but the master disk must be the one used on the computer. If the user ruins the master, he copies from the back-up to the master and uses it once again. This will work if the master "crashes" and can be recopied onto. But what happens if we spill ketchup or ice cream on the master, rendering it unusable?

### Retail Sales

Parts of the show reminded me of San Francisco's Ghiradelli Square, where street vendors peddle their goods. Several companies sold everything from computers to joysticks. One, 800 Software, did a booming business selling software at a discount (typical prices: *Mail Merge*, \$79; *Word Star*, \$239; *dBaseII*, \$399; *Perfect Calc*, \$139). Ira Weise, the president of this mail order house, told me, "We're content to make one-third of what a retail store makes." Another company spokesman said, "We've had an excellent response. We've taken more than 300 orders during the show, and there are still four hours left."

(If the average sale was \$150, they booked \$45,000 worth of business at the show. Not bad!)

### A Software Buying Service

Interactive Tele-Marketing (ITM) displayed an interesting software buyer's service at the show. For \$100, you get a catalog that ranks software by type (e.g. spreadsheet, database, education, household and personal). You learn which software is outstanding and which is the most popular. Members also receive a monthly software newsletter and periodic reports on software. The report they gave me covering the second generation of electronic spreadsheets was well written and easy to understand. ITM also sells software to members, usually at one-third below the list price. Members are also entitled to software consultation over the telephone.

### Other CP/M Shows

A representative of Digital Research told me that the company was so delighted with the response to CP/M '83 that CP/M '84 is a certainty. It will be held in January at the Moscone Center in San Francisco.

There's little doubt in my mind that we'll be seeing at least two CP/M shows a year, for many, many years to come. □

### COMPUTERS

	CASH PRICE	RETAIL
Eagle II Duel 780K.....	\$1,795.....	\$1,995
Eagle III Duel 1.58Mb.....	\$2,395.....	\$2,995
Eagle IV 10Mb Hard Disc.....	\$3,195.....	\$3,995
Eagle PC (IBM Comp.).....	\$2,799.....	\$3,495
Eagle 1620.....	\$3,599.....	\$4,495
Eagle 1630.....	\$5,499.....	\$6,995
NEC APC 128K Mono.....	\$2,299.....	\$2,748
NEC APC Duel Drive.....	\$2,799.....	\$3,448
NEC APC Duel Drive Color.....	\$3,499.....	\$4,198
SANYO MBC 1000 w/micropro.....	\$1,589.....	\$1,995
TELERAM T-3000 128K.....	\$2,395.....	\$2,995
TELEVIDEO (Complete Line).....	CALL	
TELEFAST (GL/INV/AR/AP/PAY)ea.....	\$390.....	\$750
COMPU-PRO, ALTOS.....	CALL	

### PRINTERS

NEC 7710/7730.....	\$2,190.....	\$2,825
NEC 3510.....	\$1,549.....	\$1,895
NEC 3530.....	\$1,629.....	\$2,050
NEC 3550(For IBM).....	\$1,899.....	\$2,350
DIABLO 620.....	\$ 999.....	\$1,195
DIABLO 630 API.....	\$1,799.....	\$2,345
TOSHIBA P1350.....	\$1,799.....	\$2,195
C, ITOH, OKIDATA.....	CALL	
TALLY, QUME.....	CALL	

ORDER DESK: INTERNATIONAL ORDERS:  
(313) 886-1233 TELEX 230455

## AMERICAN MICRO

P.O. BOX 36222  
1039 SUNNINGDALE DRIVE  
GROSSE POINTE, MI 48236

Order by mail or telephone. Cashiers checks, money orders or bank wire transfers honored immediately. Master Charge and Visa add 3%. UPS ground add 3%. Michigan resident add 4% sales tax. All equipment in factory cartons including manufacturers warranty.

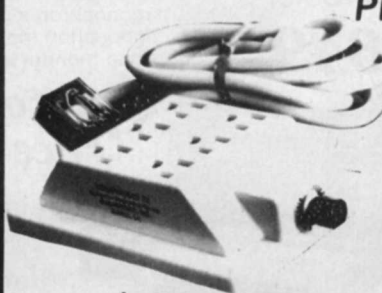
## PROTECT YOUR COMPUTERS, DRIVES, PRINTERS, DISKS, BUSINESS!

Born from necessity —

## COM-PROTECT III<sup>™</sup>

PROTECTS FROM:

- Power Outages!
- Power Surges!
- Spikes!
- Brown-Outs!
- R.F. Line Interference!
- And More!
- 6 Outlets
- 15 Amp Rating
- 90 Day Replacement Warranty



**\$79<sup>95</sup>**  
Shipping \$3.00

## COM-PROTECT III<sup>™</sup>

Computer Protection Device  
Don't risk chip  
damage or disk loss!

## COM-PROTECT INC.<sup>®</sup>

Rt. 4-Box 427X  
Slidell, Louisiana  
70458  
504-641-1316

VISA  
MASTERCARD  
ACCEPTED

CIRCLE 235 ON READER SERVICE CARD

CIRCLE 234 ON READER SERVICE CARD

# Micro Prices

## Apple Utilities & Business

Screenwriter II	\$ 82
Visicalc 3.3	\$165
Visischedule	\$199
Visitrend/Visiplot	\$199
The Word Handler	\$129
Magic Window II	\$ 95
Magic Mailer	\$ 45
Magic Words	\$ 45
Real Estate Analyzer II	\$119
Supercalc	\$165
PFS: Report (News)	\$ 85
PFS:	\$ 85
PFS: Graph	\$ 85
The General Manager	\$ 97
D.B. Master	\$ 97
Pascal Programmer	\$ 89
Pie Writer	\$ 95
Wordstar	\$299
Datafax	\$129
Datalink	\$ 65
The Home Accountant	\$ 48
Payroll Manager	\$199
Pie Writer/Multi 80 column	\$ 95
Pro-Easywriter/Mail Combo	\$209
Executive Briefing System	\$139
The Sensible Speller	\$ 79
Mail Merge	\$159
Wordstar (French)	\$299
Wordstar (Spanish)	\$299
Spellstar	\$119
Calstar	\$119
First Class Mail w/Form Letter	\$ 55
E-Z Ledger	\$ 45
Tax Manager	\$ 99
The Dictionary	\$ 99
Versawriter Pak 1	\$ 27
Versawriter Pak 2	\$ 27
Personal Investor	\$ 95
General Ledger	\$239
Accounts Receivable	\$239
Accounts Payable	\$239
Executive Secretary	\$159
Executive Speller	\$ 55
TASC Compiler	\$119
Basic Compiler	\$ 65
Link Video Apple II	\$105
Link Video Apple III	\$139
LISA 2.5	\$ 55
Bag of Tricks	\$ 27
A.L.D.S.	\$ 89
S.A.M.	\$ 85
Super Disk Copy III	\$ 20
The Artist	\$ 65
3-D Supergraphics	\$ 27
Program Line Editor	\$ 27
Beagle Bros./Apple Mechanic	\$ 20
Beagle Bros./Utility City	\$ 20
Beagle Bros./Frame Up	\$ 20
Beagle Bros./Alpha Plot	\$ 27
Beagle Bros./Tip Disk I	\$ 15
The Graphic Solution	\$ 99
The Dictionary	\$ 65
The Data Factory	\$ 65
Creative Financing	\$125
Real Estate Analyzer II	\$125
Formal II	\$109
Infostar	\$229
Datastar	\$169
P.M.P. Property Management	\$145
Visidex	\$169
Visiteam	\$ 89
Select Word Processing	\$299

## Apple Pre-School/ Educational

Sticky Bear Bop	\$30
Sticky Bear Numbers	\$30
Sticky Bear ABC	\$30
In Search of Amazing Things	\$27
Hey Diddle Diddle	\$20
Snooper Troops #1/Spinnaker	\$30
Snooper Troops #2/Spinnaker	\$30
Delta Drawing/Spinnaker	\$45
Story Maker/Spinnaker	\$26
Face Maker/Spinnaker	\$26
Rhymes & Riddles/Spinnaker	\$20
PLATO Whole Numbers	\$39
PLATO Decimals	\$39
PLATO Fractions	\$39
Alien Counter/Face Flash	\$24
Gulp & Arrow Graphics	\$24
Frenzy-Flip/Flop	\$24
Battling Bugs/Concentration	\$24
The Jar Game/Chaos	\$24
PDI Preschool IQ Builder	\$24
Planetary Guide/Synergistic	\$23
Star Gazers Guide/Synergistic	\$22
Astro Quotes/PDI	\$17
Juggles Rainbow/Learning Co.	\$30
Bumble Games/Learning Co.	\$39
Bumble Plot/Learning Co.	\$39
Gertrudes Secrets/Learning Co.	\$49
Gertrudes Puzzles/Learning Co.	\$49
Rocky's Boots/Learning Co.	\$49
Compu-Read/Eduware	\$23
Spelling Bee w/Reading Primer	\$27
Algebra I/Eduware	\$34
Fractions/Eduware	\$34
Decimals/Eduware	\$34
Master Type/Lighting Software	\$27
Type Attack/Sirius	\$27
Wordrace/Don't Ask	\$17
Dueling Digits/Broderbund	\$20
SAT Word Attack/Harcourt Brace	\$34
New Step by Step/PDI	\$59
Whole Brain Spelling/Sublogic	\$23

## Apple Top Sellers

Canyon Climber	\$20
Normandy	\$27
Germany	\$39
Epidemic	\$23
Galactic Adventure	\$39
Galactic Gladiator	\$27
The Cosmic Balance	\$20
The Battle of Shiloh	\$27
Guadacanal	\$39
Pursuit of the Graf Spree	\$39
The Shattered Alliance	\$39
Space Eggs	\$20
Sneakers	\$20
Mission: Asteroid	\$15
Accey Deucey	\$20
AE	\$20
Space Vikings	\$34
Zenith	\$23
Rendezvous	\$27
Wordrace	\$17
Fathom's Forty	\$23
Raster Blaster	\$20
Cyclod	\$20
Kabul Spy	\$20
Zero Gravity	\$20
Electric Duet	\$20
Tuesday Morning Quarterback	\$20
Hi-Res Computer Golf	\$20
David's Midnight Magic	\$23
Track Attack	\$20
Bug Attack	\$20
Sargon II	\$23
Hi-Res Football	\$27
Star Blazer	\$22
Swashbuckler	\$23
Rear Guard	\$20
Labyrinth	\$20
Repton	\$ 27
Critical Mass	\$ 27
Cannonball Blitz	\$ 23
Sargon II	\$ 23
Pool 1.5	\$ 23

## Apple Hit List

Cyborg	\$22
Crisis Mountain	\$23
Cytron Masters	\$27
S.E.U.I.S.	\$27
Knight of Diamonds	\$23
Way Out	\$27
Zaxxon	\$27
S.A.G.A. Adventure	Ea. \$27
Serpentine	\$23
Choplifter	\$23
Frogger	\$23
Sea Fox	\$20
Temple of Apshei	\$27
Ultima	\$27
Zork I	\$27
Zork II	\$27
Zork III	\$27
Castle Wolfenstein	\$20
Wiz & Princess	\$22
Ulysses & The Golden Fleece	\$23
Wizardy	\$34
Tigers In The Snow	\$27
Sherwood Forest	\$23
Deadline	\$34
Bandits	\$23
Starcross	\$27
Aztec	\$27
Mask of the Sun	\$27
Pie Man	\$20
Miner 2049er	\$29
Wavy Navy	\$23
Ultima	\$39
Dark Crystal	\$27
Evolution	\$34
Millionaire	\$55
Hi Res Secret	\$79
Police Artist	\$23
Suspended	\$35
S.A.G.A.: Secret Mission	\$27

## Newly Arrived

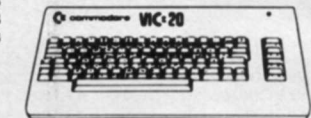
**Franklin  
Ace 1000**  
64K w/Color  
**\$849**



## Apple IIe

64K with 80 column card, one Apple drive, one Apple low glare monochrome (green phosphor) monitor, one monitor stand

**Call For  
Price**



## Commodore

VIC 20	\$ 99
COMMODORE 64	\$289
with factory rebate	
1530 DATASETTE	\$ 59
1541 DISK DRIVE	\$329
1525 GRAPHIC PRINTER	\$329
1600 MODEM	\$ 89
1701 MONITOR	\$289
SUPER EXPANDER	\$ 59
8K MEMORY	\$ 52
16K MEMORY	\$ 79
RS232 INTERFACE	\$ 43

Call Toll Free

**1-800-634-6766**

Order Line Only

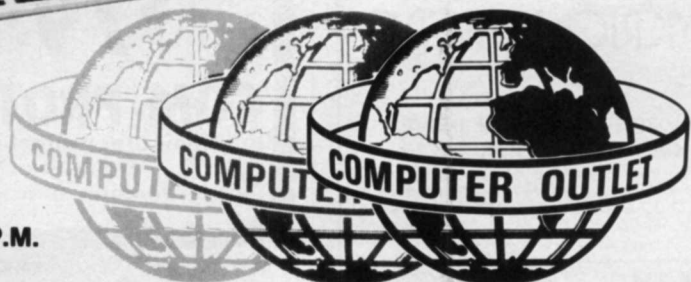
Information & Order Inquiries (702) 369-5523

Technical Assistance (702) 796-0296

We accept VISA and MasterCard

Mon. — Fri. 8 A.M. to 6 P.M. — Sat. 9 A.M. to 6 P.M.

Dealers' Inquiries Invited



# Just For You.



**1200 XL \$419**  
with factory rebate

**800 48K \$389**  
with factory rebate

**400 16K \$159**  
with factory rebate

1010 Recorder	\$ 72
410 Recorder	\$ 72
810 Disk Drive	\$419
1025 Printer	\$409
830 Modem	\$145
850 Interface	\$159
481 Entertainer	\$ 64
482 Educator	\$110
483 Programmer	\$ 52
484 Communicator	\$289
853 16K Ram	\$ 74
The Bookkeeper Kit	\$165
CX4104 Mailing List	\$ 19
CX404 Word Processor	\$102
CXL4007 Music Composer	\$ 42
Programming 2 & 3	\$ 22
Conversational Languages	\$ 42
CX4018 Pilot	\$ 55
CX405 Pilot	\$ 92
CXL4003 Assembler Editor	\$ 42
CX8126 Microsoft Basic	\$ 62

## Business & Utilities

Visicalc	\$169
Mail Merge	\$ 20
Data Perfect	\$ 75
Letter Perfect	\$105
Text Wizard	\$ 65
Datasm 65 2.0	\$ 59
File Manager 800 +	\$ 65
Syn Assembler	\$ 34
Page 6	\$ 20
Atari World	\$ 39
K-Dos	\$ 59
Micropainter	\$ 23
Color Print	\$ 27
Lisp Interpreter	\$ 79
Bishops Square	\$ 20
Graphic Master	\$ 27
Graphic Generator	\$ 17
Basic Compiler	\$ 65
Computari's Financial Wizard	\$ 45
Color Accountant	\$ 65
Datalink	\$ 27
File It 2 System	\$ 34
Diskette Inventory System	\$ 17
P.M.P. Property Management	\$179

## Programming Techniques

Display Lists	\$ 17
Horiz/Vert Scroll	\$ 17
Page Flipping	\$ 17
Basics of Animation	\$ 17
Player Missile Graphics	\$ 24
Sound	\$ 24
Data Files	\$ 24

## Printers

NEC	
NEC 8023A	\$ 439
NEC 3530	\$1599
NEC 7710	\$2059
NEC 7730	\$2059
NEC 3550	\$1899

Diablo	
Diablo 620R (25CPS)	\$ 949
Diablo 630R (40CPS)	\$1729
Diablo 630KSR (40CPS)	\$2429

Epson	
FX80	\$ 599
FX100FT	\$ 799

Smith Corona	
TP-1 Parallel	\$ 499

Okidata	
ML82A	\$ 419
ML83A	\$ 649
ML84P	\$ 979
ML84S	\$1089
ML92	\$ 489
ML93	\$ 869

IDS	
Microprism 80	\$ 549
Prism 132	\$1399
(with Sheetfeed & Graphics)	
Prism 132	\$1589
(with Sheetfeed, Graphics & Color)	
Prism to IBM Cable	\$ 48

Citoh	
8510 Prowriter	\$ 365
F10 Starwriter	\$1199
F10 Printmaster	\$1599

Mannesmann Tally	
MT 160L	\$ 599
MT 1802 (Parallel)	\$1559
MT 1805 (Serial)	\$1559

Gemini	
Gemini 10	\$ 319
Gemini 15	\$ 479

Qume	
Qume Sprint 11 +	\$1349
Tractor Feed	\$ 175
Printer Interface	\$ 75

## Monitors

Amdek	
Color II	659
Color III	\$ 399
Color IV (RGB Analog Input)	\$1029
Amdisk 3	\$ 729
Amplot	\$ 769
Amdek	\$ 179

NEC	
NEC JB 1201M	\$ 169

Transtar	
Transtar 20	\$ 139

Quadram	
Quadchrome	Call for Price
Hi-Res RGB Monitor	
690 x 240 Resolution	

## IBM Specials

Advanced Operating Systems	
The Programmer	\$129

Applied Software	
Versaform	\$249

Ashton-Tate	
sBase II (CP/M 86)	\$419
sBase II (MS Dos)	\$419

Continental Software	
The Home Accountant Plus	\$ 95
1st Class Mail	\$ 79

Computer Software Technology	
Word/PC	\$ 49

Davidson & Associates	
Speed Reader	\$ 49

Datamost	
Real Estate Investment Program	\$ 79
Write-On	\$ 85

Comprehensive Software	
PC Tutor	\$ 55

Denver Software	
Executive Accounting System	\$469
(128K)	

Eagle Software	
Money Decisions	\$129

Howard Software	
Real Estate Analyzer II	\$159
Tax Preparer 1983	\$159

Information Solutions	
25:01	\$ 65

Innovative Software	
T.I.M. III	\$299

IUS	
Easy Filer	\$239
Easy Writer II	\$209
Easy Planner	\$159
Accounts Receivable	\$369
Accounts Payable	\$369
General Ledger	\$369
Financial Management Series	\$899

Micro Lab	
The Tax Manager	\$159

Micro Pro	
Wordstar	\$299
Mailmerge	\$159
Spellstar	\$109
Infostar	\$299
Reportstar	\$209

North American Business Systems	
Answer	\$159

PBL Corporation	
Personal Investor	\$ 89

Peachtree	
General Ledger	\$329
Accounts Receivable	\$329
Accounts Payable	\$329
Peach Pak (GL/AR/AP)	\$329

Software Publishing	
PFS Report	\$ 84
PFS File	\$ 84

Digital Research	
Concurrent CP/M 86	\$209
C Basic 86	\$125
Pasca/MT + 86	\$239
Speed Programming Package 86	\$125
CIS Cobol 86	\$489

Peter Norton Computing	
Norton Utilities	\$ 55

Select	
Select Word Processing System	\$299

Softword Systems	
Wordmaker	\$289

Sorcim/ISA	
Supercalc	\$179
Superwriter	\$239
Spellguard	\$125

Southeastern	
Data Capture	\$ 75

Visicorp	
Visicalc (256K)	\$165
Desktop Plan 1	\$199
Visitrend/Plot	\$199
Visifile	\$199
Visidex	\$165
Visischedule	\$199
Business Forecasting Model	\$ 69

## ★★★ Specials of the Month ★★★

Elephant Disks s/s	\$ 20
Verbatim Disks s/d	\$ 24
Maxell Diskettes s/d	\$ 30
Amdek Color I	\$299
Amdek Color II	\$659
Micromodem II	\$259
Micromodem II w/Terminal Pk.	\$299
Novation Apple Cat II Modem	\$329
Hayes Smartmodem 300	\$209
Hayes Smartmodem 1200	\$499
The Grappler +	\$119
Flip & File Diskette Box	\$ 21
Microbuffer II 32K Parallel	\$199

1095 E. Twain (702) 796-0296 Las Vegas, Nevada 89109

# COMPUTER OUTLET

### ORDERING INFORMATION AND TERMS:

For fast delivery send cashier checks, money orders or direct bank wire transfers. Personal and company checks allow 3 weeks to clear. C.O.D. orders (\$3.00 minimum) and 1% of all orders over \$300. School purchase orders welcome. Prices reflect a cash discount only and are subject to change. Please enclose your phone number with any orders.

**SHIPPING:** Software (\$2.50 minimum). Shipping — Hardware (please call). Foreign orders APO & FPO orders — \$10 minimum and 15% of all orders over \$100. Nevada residents add 5 3/4% sales tax. All goods are new and include factory warranty. Due to our low prices, all sales are final. All returns must have a return authorization number. Call 702-369-5523 to obtain one before returning goods for replacement. All returned merchandise is subject to a restocking fee and must come with their original packaging in order to be accepted. NO returns permitted after 21 days from shipping date.

CIRCLE 131 ON READER SERVICE CARD

## Switch-Type Joysticks for Atari and Apple

**Tom and Kelda Riley**

This month we are going to look at some homebuilt joysticks for Atari and Atari-compatible systems. We will describe two different designs for Atari joysticks: One is similar to the commercial unit, but the other is a new type of joystick that can be customized for individual hand fit and high-speed action. We also include the electronic circuit needed to wire these Atari joysticks for use on an Apple computer.

### The Electronics Of The Atari Joystick

The Atari joystick is simply a collection of five normally-open momentary-contact switches. These switches allow the computer to detect movement in eight directions and to read the input from a fire button. Four of the switches are paired so that only one switch at a time can be pressed. One pair controls up and down on the screen, the other pair controls left and right. The switches are paired by mechanical linkage rather than by electrical circuits. The fifth switch, the pushbutton, is mechanically independent of the others, but all share one common electrical conductor.

This construction is completely different from that of Apple-type joysticks, which feature two lever-controlled variable resistors. The Apple type are analog input devices, having many values over their range, while the Atari type are digital, with only a few discrete input commands.

In an Atari joystick you need precise control so that you can give an exact command every time, good feel so that your hands don't tire, and, above all, speed. Another helpful feature, but one

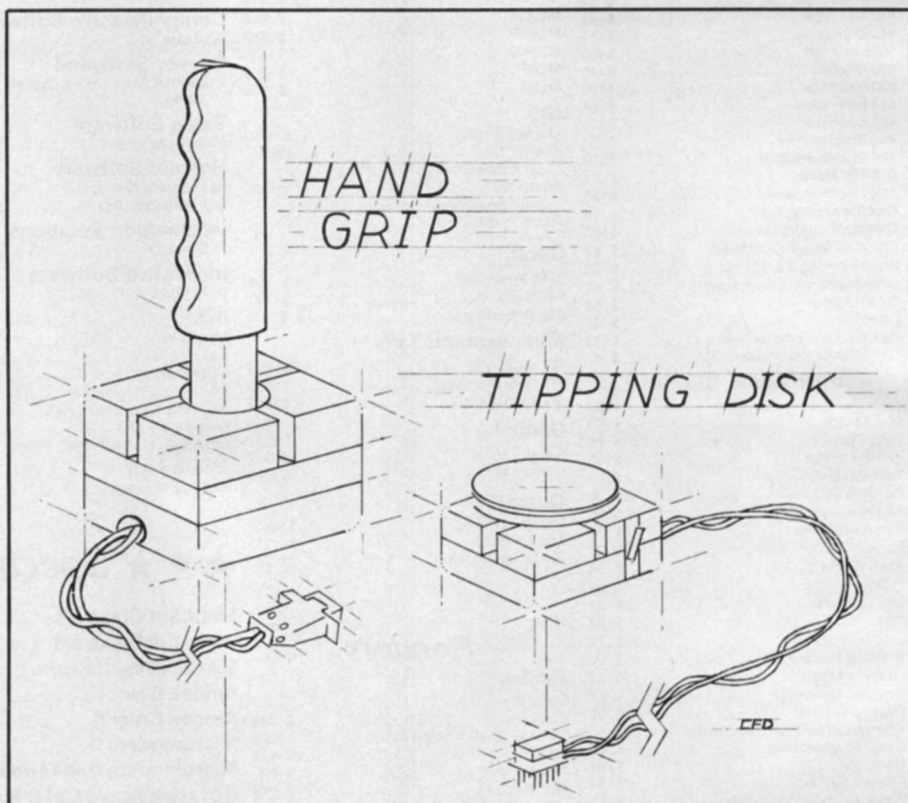


Figure 1. Joystick sketches.

that most commercial joysticks for the Atari lack, is tactile feedback, which means that there is a definite sound and feel when electrical contact is made. The joystick should also have good mechanical strength to insure long life, since it will see heavy use.

The most common commercial units for the Atari do not meet the above requirements. They are often awkward to hold, particularly for left-handers; it is difficult to tell when contact is made; and handle movement is limited and rubbery. We think you will have a much

better joystick if you build your own. Constructing an Atari-type joystick may seem to be a somewhat mundane exercise, but working out the details of precise, rapid hand movement makes this task an excellent lesson in man/machine interface.

### Features Of Two Homebuilt Units

Figure 1 shows sketches of two joysticks for the Atari. Each unit is constructed from a block of hardwood in which the switches and wiring are embedded. The hand grip joystick, like

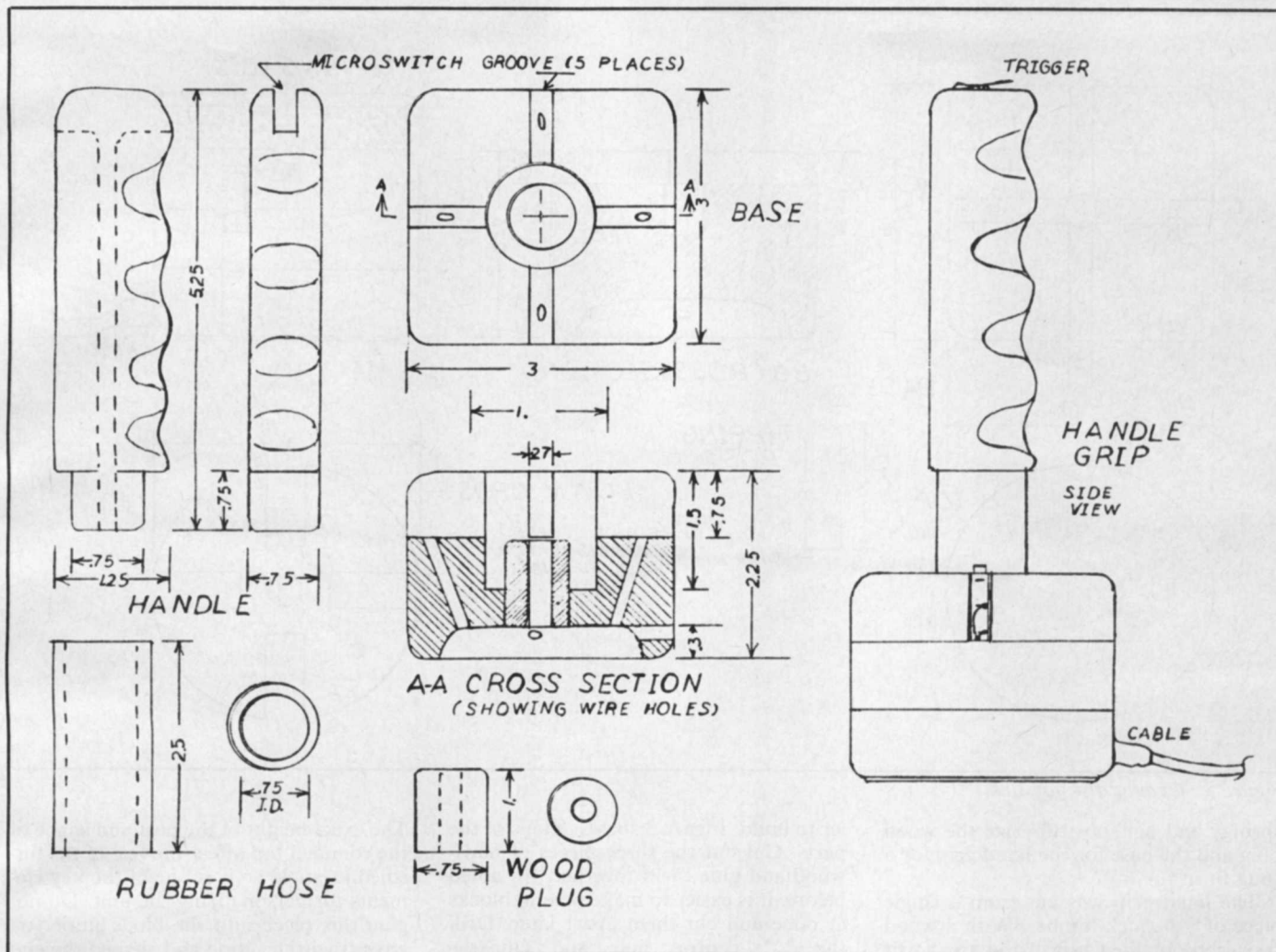


Figure 2. Atari joystick.

the standard unit, is used by holding the block in one hand and the grip in the other. The fire button on top of the handle will feel natural to most players. The weight of the homebuilt unit improves



"Gee, this 'Lost In Space' game is intense!"

the feel, and the switches click to give you tactile feedback.

To operate the tipping disk unit, you hold the block in one hand and work the fire button with the index finger of that hand. (Your index finger can press a button more quickly than your thumb.) With the finger tips or palm of your other hand you press the disk to direct the movement. With the tipping disk joystick, the player controls the computer with hand movements that are quite different from those of the conventional units.

#### Construction Of The Hand Grip Joystick

Figure 2 presents a side view of the component parts of the hand grip unit. The base is a hardwood block that you make by gluing three  $\frac{3}{4}$ " thick boards together. We used oak for all the wooden parts of the prototypes, but any attractive wood free from cracks and large knots will do as well. You can use clear pine, but the finished unit will not be as strong or good looking.

Cut the microswitch grooves with a dado blade in a table or radial arm saw (or use a router or handsaw). Since it is somewhat difficult to cut grooves in this small a block with a power saw, you might want to start with three 14" x 3" boards. Apply carpenter's glue and clamp them together. Drill the large holes and cut the microswitch grooves for four blocks into the one large piece. This accomplished, you can saw the large piece into four blocks. This is easier than trying to work with a small block and increases your cost very little. If you want to make only one joystick, choose the best of the blocks and discard the others.

Cut out the large central hole with a hole saw in an electric drill or with a large adjustable auger bit in a brace. It is easiest to do this before the grooves are cut.

The rubber hose shown in Figure 2 serves as a flexible joint. It is the type used for automobile heaters and was purchased at an auto supply store. Other types of hose may be used if they are

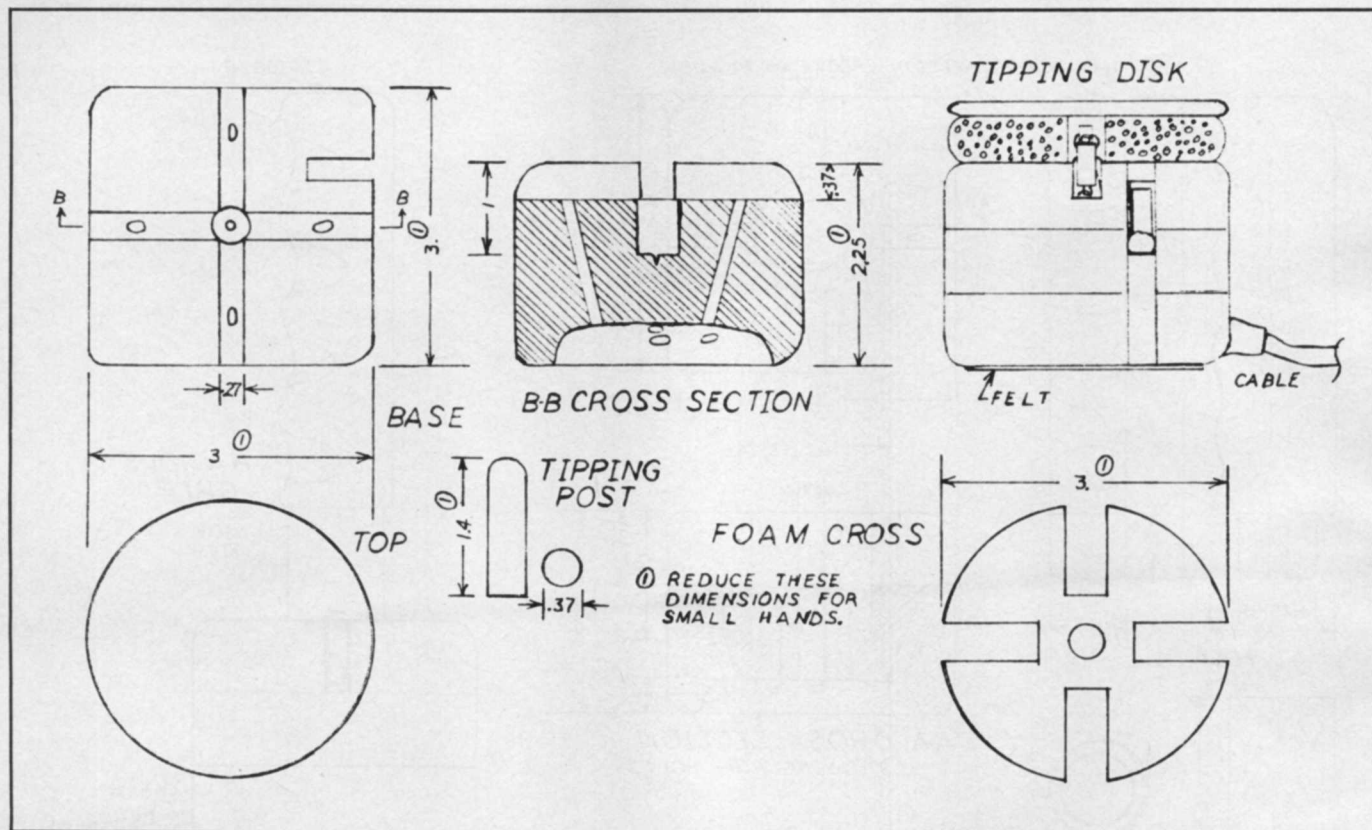


Figure 3. Tipping disk joystick.

springy and not too stiff. Size the wood plug and the base for the hand grip for a snug fit in the hose.

The hand grip was cut from a single piece of  $\frac{3}{4}$ " thick lumber. With a wood rasp, contour the front of the grip to fit the fingers of your hand. The microswitch groove was cut with a small handsaw and a  $\frac{1}{4}$ " wood chisel. If you prefer, you can move this switch to the front of the grip so that you operate it with your index finger rather than your thumb. The hole down the middle for the fire button wires was drilled with a  $\frac{1}{4}$ " paddle drill.

Drill the hole for the wood plug and then carve out part of the bottom of the block to make a cavity in which to place the wire connectors. Glue the plug in place. For the wire of each microswitch drill a  $\frac{3}{16}$ " hole; drill a slightly larger hole for the main cable. All of these holes lead to the bottom cavity.

Rasp off the outside corners of the block. (The amount of rounding off you choose to do is one aspect of customizing your unit.) Sand all surfaces smooth, taking special care with the hand grip. The best finish for the wood parts is two coats of polyurethane varnish.

#### The Tipping Disk Joystick

The construction of the tipping disk is much the same as that of the hand grip unit. If anything, the tipping disk is eas-

ier to build. Figure 3 shows details of the parts. Cut out the three pieces of hardwood and glue them together. As noted before, it is easier to make several blocks at once and cut them apart later. Drill the  $\frac{3}{8}$ " central hole and cut the microswitch grooves, following the instructions for the hand grip unit.

The groove for the fire button is on the side of the block; in Figure 3 it is shown for right-handed players. The right- or left-hand orientation of the unit is set when you cut this groove and the hole for the main cable. To locate the groove properly, hold the partially finished block in your hand and find the most comfortable place for your index finger.

Drill the holes for the wires and the main cable and chisel out the bottom compartment as before. Round off all outside corners until the unit rests comfortably in your hand, and sand all surfaces smooth.

The tipping disk itself is made of masonite or other thin material. It can be any diameter that suits you, either larger or smaller than the base block. Cut it out with a coping saw, and round off and smooth the edges. The disk and the block should be finished with polyurethane varnish before you begin wiring the unit.

The tipping post is a short piece of  $\frac{3}{8}$ " dowel, one end of which is rounded.

The exact height of the post and shape of the rounded top affect the feel of the finished joystick; so it is one of the key elements for personalizing the unit. Do not glue this piece into the block until you have tried the action and shaped the end to get the response you want.

The springy foam cross that fits beneath the disk was cut with household scissors from  $\frac{1}{2}$ " thick polyurethane shipping material. The thickness and shape of this foam piece is another important element in personalizing the unit.

#### Adjusting The Size

The dimensions given for both of these joysticks will produce a unit that fits an adult's hands. Smaller hands will need a smaller block. You can reduce the 3" square dimension of the block to as small as  $2\frac{1}{4}$ " for the tipping disk and to  $2\frac{1}{2}$ " for the handgrip unit. The smaller blocks are somewhat harder to wire. If you cut a wood block large enough to make three or four units, you can cut them down to the exact size you need. (Remember the woodworker's lament, "I've cut it off twice already, and it's still too short.")

#### Electrical Components

The key electrical parts of these units are the switches; they are, in fact, almost the only electrical parts. Radio Shack

# CAVES OF OLYMPUS



Beneath the Palace of Anson Argyris, on the Planet Olympus, lies the last fortress to withstand the onslaught of the Laren forces **The Caves of Olympus.**

Protected by a robotic over-seer, the fortress, with its miles of corridors, false chambers, death traps, one way doors, and matter transport devices, is impregnable to all but one... the little Vario 500 egg-shaped robot you become.

- Full Color Hi-Res Graphics
- Blaster, sight and sound special effects
- Requires both quick action, and careful plotting and reasoning
- Pulsating matter transportation

Caves of Olympus #26094 \$39.95 Apple IIe-Plus®



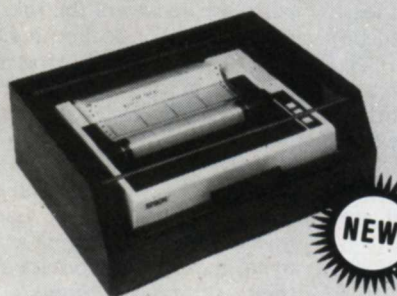
**Howard W. Sams & Co., Inc.**  
4300 West 62nd Street  
Indianapolis, IN 46268

To find your nearest dealer or to order, call 800-428-3696 or 317-298-5566 and reference SW102. In Canada, contact Lenbrook Industries, Ltd., Scarborough, Ontario.

Apple products are a registered trademark of Apple Computer, Inc.

CIRCLE 182 ON READER SERVICE CARD

**Epson, OKI, IDS, NEC, Diablo, Qume**



**NEW!**

## ACOUSTIC ENCLOSURES

- Reduces Noise Up to 90%
- Heavy Duty Acrylic Cover
- Bottom Feed Capability
- Woodgrain Finish

**Micro Printercenter™**

**Dealer & Ordering Info**

**800-343-4311**

Master Charge and Visa Accepted  
Shipping & Handling Charges Additional

**CAB-TEK, Inc.**

Riverside St. Nashua, NH 03062  
CIVILIZING COMPUTERS

**SAVE!  
SAVE!**  
FROM  
**\$99.00**

MPC I \$99 (MX 80) MPC II \$129 (OKI82)  
MPC III \$179 (83A, MX100) MCP IV \$199 (Daisy Printer)  
Power Control & Ventilation \$80  
Paper Rack \$30 Bottom Feed Brackets \$30  
MPC I SHOWN

CIRCLE 232 ON READER SERVICE CARD



EPSON FX-80  
EPSON FX-100  
OKIDATA 92  
OKIDATA 93  
STAR GEMINI 10  
STAR GEMINI 15  
NEC 8023  
C. ITOH 8510  
C. ITOH 1550

**Call for Prices**



**Letter Quality Printers**

C. ITOH F-10 40 CPS Par ..... 1249<sup>00</sup>  
C. ITOH F-10 55 CPS Par ..... 1549<sup>00</sup>  
DAISYWRITER 2000 40 CPS ..... 1249<sup>00</sup>  
NEC 3550 for IBM ..... CALL



AMDEK VIDEO 300 12" hi-res Gr 159<sup>00</sup>  
NEC 1260 12" Green ..... 139<sup>00</sup>  
AMDEK Color II Plus 13" ..... 349<sup>00</sup>  
AMDEK Color II hi-res RGB ..... 699<sup>00</sup>  
NEC 12" hi-res green ..... 159<sup>00</sup>  
TAXAN Vision 12" RGB ..... 359<sup>00</sup>  
ZENITH 12" hi-res green ..... 119<sup>00</sup>

**CATALOG**  
**Spring 1983 Collection**  
**Hundreds of Items**  
**SEND \$1.00**  
**Credited to your order.**

To order please send money order or cashier's check. Personal checks 3 weeks to clear. Prices reflect 2% cash discount. We accept VISA, MasterCard, American Express, Diners Club and Carte Blanche. Shipping, handling & insurance charges: add 3% of merchandise total (min. \$5.00). California residents add 6% sales tax. Foreign customers please call or write. Prices and availability subject to change without notice. All equipment is new and warranted by the manufacturer.

**NATIONAL COMPUTER PRODUCTS**  
8338 Center Drive, La Mesa, CA 92041-3791

**PLACE ORDERS 800-854-6654** Calif., Alaska, Hawaii  
**TOLL FREE** (619) 698-8088

CIRCLE 224 ON READER SERVICE CARD



**FRANKLIN ACE 1000 & 1200**  
Apple II compatible computer 64K, upper/lower case, and more!  
**PLEASE CALL FOR DETAILS.**

**Apple Accessories**  
VIDEX 80 Column Card ..... 239<sup>00</sup>  
MICROMODEM II by Hayes ..... 269<sup>00</sup>  
Z-80 SOFTCARD by Microsoft ..... 239<sup>00</sup>  
GRAPPLER PLUS Printer Card ..... 129<sup>00</sup>



**corona.**  
**IBM PC COMPATIBLE PORTABLE**  
**call for price**  
Please call for more details.



**ATARI 1200XL**  
**call for price**  
ATARI 800 with 48K ..... 499<sup>00</sup>  
ATARI 810 Disk Drive ..... 429<sup>00</sup>

**Modems**  
HAYES SMARTMODEM 300 ..... 219<sup>00</sup>  
HAYES SMARTMODEM 1200 ..... 519<sup>00</sup>  
Please call for other modem pricing.



**COMMODORE 64 Computer**  
**Special Price \$379.95**

COMMODORE 1541 Disk Drive ..... 319<sup>00</sup>  
Datasette program recorder ..... 65<sup>00</sup>  
DATA 20 Z-80 & 80 column pac. .... 229<sup>00</sup>



**IBM PC compatible computer**  
Includes 128K, 2 DS/DD 320K disk drives, keyboard, video card and MS-DOS software. Monitor not included.

**COMPLETE SYSTEM**  
**call for price**

**IBM Accessories**  
Quadram 64K ..... 299<sup>00</sup> 128K ..... 379<sup>00</sup>  
Quadboard 192K ..... 469<sup>00</sup> 256K ..... 559<sup>00</sup>  
AST ComboPlus w/64K ..... 469<sup>00</sup>



**Kaypro**  
The anytime-anywhere computer. Includes CP/M, C-BASIC, a spreadsheet and wordprocessing software.  
**PLEASE CALL FOR MORE DETAILS.**

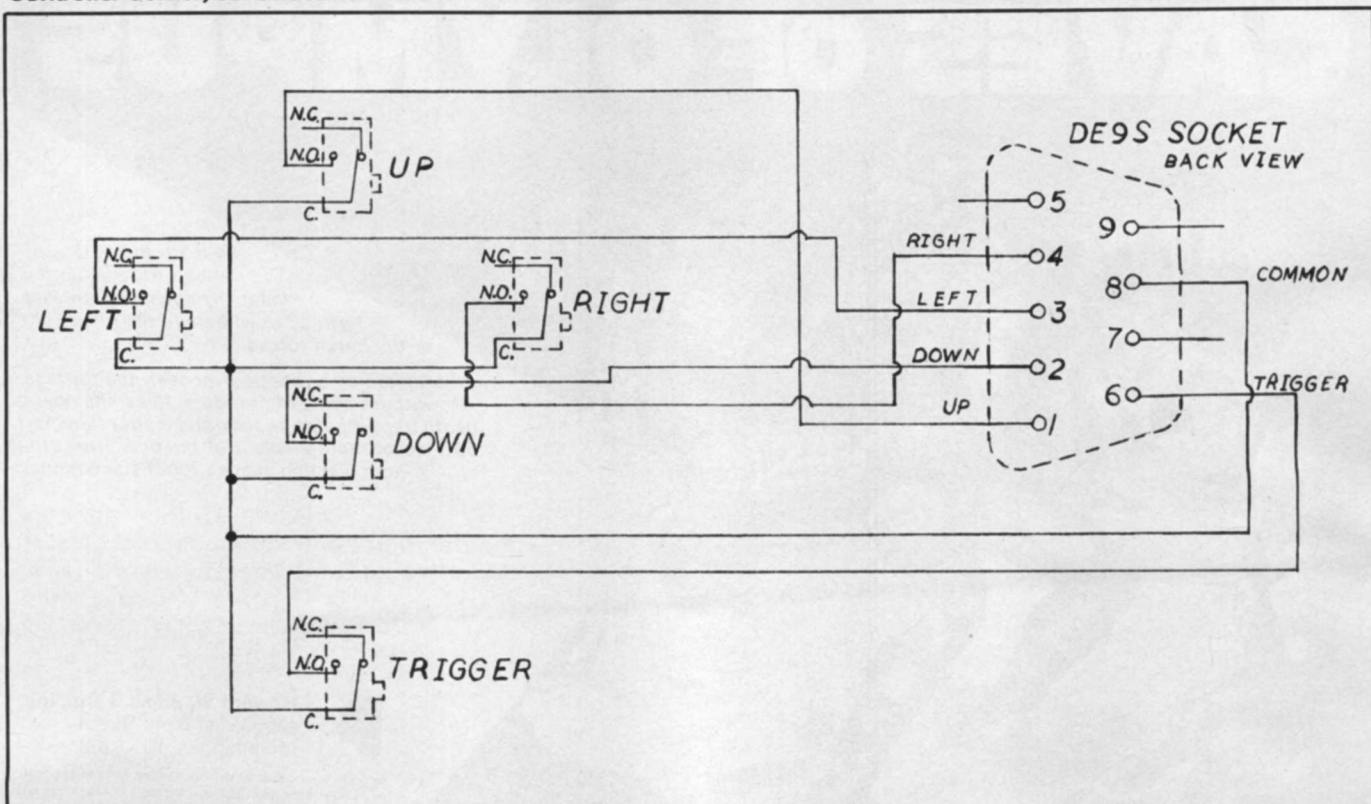


Figure 4. Microswitch Atari joystick.

Submini Lever Switches were used for the prototypes. Discount mail order houses like PolyPaks (16-18 Del Carmine St., Wakefield, MA 01880) have similar switches for about half the price. Look for those described as "leaf" microswitches. The size of these switches and their terminals varies; so it is best to have them in hand before cutting the microswitch grooves in the wood block. Since the hinges on the Radio Shack switches (and probably most others) are a bit weak, they were strengthened with a matchhead size dab of silicone sealant.

The cable for each unit requires six conductors. We used two runs of four-conductor telephone cable with stranded wires, but you could use any small, flexible six-conductor cable.

The plug for the homebuilt Atari joystick is a DE9S socket from Jameco Electronics; it is a first cousin to the RS-232 socket used on many peripherals. The hand-wired version of this socket requires a separate plastic hood. The two plastic tabs on the hood stick out too far and must be filed down. The two clamping screws included with the hood are not needed for this project.

Distinguishing plugs from sockets on computer equipment can be confusing. A connector is a plug if the small metal parts that conduct the electricity are metal prongs. It is a socket if these small parts are receivers for the prongs (note the letter S for socket in DE9S). Either type of connector may be mounted on a cable or in the electrical device itself. Be careful not to order the wrong type.

#### Electrical Wiring

Figure 4 is the electrical schematic for any Atari-type joystick. Each of the five microswitches is wired as a normally-open, momentary-contact switch. All of their common terminals (a small c identifies them) are connected and wired to pin 8. Each switch has its own wire on the normally open (n.o.) terminal.

To install the switches, solder two 3" pigtailed of insulated wire to each switch. Telephone cable wire is excellent for this purpose. Use one wire color for all the common terminals and five different colors for the normally open terminals. Poke the wire through the holes. Position the switches with their hinges toward the center on the disk unit and down on the hand grip unit. The switches on the hand grip unit should just touch the rubber hose in its central position.

The switches were wedged into place in the grooves with flat slivers of wood from a popsicle stick and fixed in place

### Parts List

Number Required	Description of Part	Suggested Supplier	Total Cost
5	Lever switch, #275-016	Radio Shack	\$7.00
10 ft.	Telephone cable, #278-366	Radio Shack	1.20
1	Socket, 9 contact, DE9S (D-submin. connectors series)	Jameco	2.00
1	Hood, DE-9H (D-submin. hoods)	Jameco	1.20
1 sq. ft.	Hardwood		2.50
Misc.	Silicone sealant, finish, etc.		1.10
	<b>Total</b>		<b>\$15.00</b>
	(approx.)		

Jameco Electronics  
1355 Shoreway Rd.  
Belmont, CA 94002  
(minimum order \$10.00)

## New! DOUBLE-TAKE ONLY 34.95

2-WAY-SCROLL / MULTIPLE UTILITY  
BY MARK SIMONSEN

LISTINGS & CATALOGS SCROLL Up AND Down, making file names and program lines much easier to access. Arrow-keys control scroll direction. **New Apple-soft List Format** lists each program statement on new line for FAST program tracing and de-bugging.

**Variable-Display** shows all of a program's strings and variables with current values. **Cross-Reference** shows line nos. on which each variable & string appears. **Better Renumber/Append** lets you merge programs (not just connect end-to-end). Applesoft **Auto-Line-Number** as you type. Instant Hex/Dec Converter, Program Stats, Cursor Eliminate/Redefine, Free Space-On-Disk...

With 2 Charts: Peaks/Pokes and Tips & Tricks

Apple Mechanic's Hi-Res type routines are usable in your programs WITHOUT LICENSING FEE. Just give Beagle Bros credit on your disk and documentation.

ONLY 29.50

## APPLE MECHANIC SHAPE-WRITER / BYTE-ZAP UTILITY BY BERT KERSEY

**SHAPE EDITOR:** Keyboard-draw shapes for animation in your programs. Create **Proportionally-Spaced Typefaces** with special characters. Six fonts included. Listable Applesoft demos show you how to animate graphics and create professional Charts & Graphs.

**BYTE-ZAP:** Rewrite any byte on a disk for repair or alteration. **Load entire sectors on the screen** for inspection. Hex/Dec/Ascii displays and input. Educational instructions include experiments for making trick file names, restoring deleted files, changing DOS, etc.

**MORE:** Useful music, text and hi-res tricks for your programs. Clear educational documentation.

(Includes Peaks & Pokes Chart and Tip Book #5)

## APPLE MECHANIC TYPEFACES BY BERT KERSEY

ONLY 20.00

**26 NEW FONTS** for use with Apple Mechanic programs. Many sizes of fully-editable characters.

**BEAGLE MENU:** Display only the file names you want from your disks (e.g. only Applesoft or only Locked files) for fast one-key cursor selection.

(Includes Peaks & Pokes Chart and Beagle Menu)



10 AS="RUQWLU RBOC YNTOOB C@OBD":  
SPEED=180: VTAB 10: PRINT AS  
20 FOR X=0 TO LEN(AS)-1: S=SCRN(X,19):  
COLOR=S+(S-12)-(S-13)-(SCRN(X,18))>10:  
PLOT X,19: NEXT X: GOTO 10

## UTILITY CITY 21 UTILITIES ON ONE DISK BY BERT KERSEY

ONLY 29.50

**LIST FORMATTER** prints each program statement on a new line. Loops indented with **printer page breaks**. A great Applesoft program de-bugger! Also...

**Multi-Column Catalogs** for printouts, auto-post Run-number & Date in programs, put invisible commands in programs, create **invisible file names**, alphabetize/store info on disk, convert dec to hex or Integer to FP, protect and append programs, dump text to printer...

**MORE TOO:** 21 Programs Total, a best-seller!  
(Includes Peaks & Pokes Chart and Tip Book #3)



## Beagle Bros Micro Software Inc.

4315 Sierra Vista | San Diego, California 92103

## DOS BOSS

ONLY 24.00

DISK COMMAND EDITOR  
BY BERT KERSEY & JACK CASSIDY

**RENAME COMMANDS AND ERROR MESSAGES:** "Catalog" can be "Cat"; "Syntax Error" can be "Oops" or anything you want. **Protect your programs.** An unauthorized save-attempt can produce a "Not Copyable" message, or any message you want. Also LIST-prevention and one-key program-execution from catalog.

**Customize DOS.** Change the Disk Volume heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and experiments. Hours of juicy Apple reading material.

**Anyone using your disks** (booted or not) will be formatting DOS the way you designed it.

(Includes Peaks & Pokes Chart and Tip Book #2)

**All Beagle Bros disks are Unlocked, Copyable, and Compatible with Apple\* II, II+ and IIe. Don't settle for less.**

"APPLE" is a registered trade mark of You-Know-Who.

## New! FLEX TEXT ONLY 29.50

20/40/56/70-COLUMNS WITHOUT HARDWARE  
BY MARK SIMONSEN

**PRINT VARIABLE-WIDTH TEXT** on both hi-res screens with **normal Applesoft commands** (including Htab 1-70). Normal, expanded & compressed text with no hardware. 70-columns requires a monitor (not tv).

**Add graphics to text** or text to graphics. Run your existing Applesoft programs under FLEX Text control. Easy to use and compatible with GPLE.\*

**DOS Tool Kit\*** font compatibility, or use the supplied Flex Text typefaces. Select up to 9 fonts with control-key commands. Print, List and Catalog in any type style! Custom text character editor included.

(Includes Peaks & Pokes Chart)

## BEAGLE BAG

ONLY 29.50

12-GAMES-PLUS ON ONE DISK  
BY BERT KERSEY

**COMPARE BEAGLE BAG** with any one-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, AND the disk is **Copyable**. You can even change the programs or list them to learn by seeing how they work.

**Twelve Games** from the Applesoft Ace, Bert Kersey—TextTrain, Slippery Digits, Wowzo, Buzzword, Magic Pack... A great variety that taps your Apple's flexibility. **Excellent review in January 83 Softalk** (page 148).

**BEAGLE MENU too:** See "Typefaces" disk.  
(Includes Peaks & Pokes Chart and Beagle Menu)

## FRAME-UP

ONLY 29.50

HIGH-SPEED DISPLAY UTILITY  
BY TOM WEISHAAR

**MAKE PROFESSIONAL PRESENTATIONS** of existing hi-res, lo-res & text frames. FAST hi-res loads in 2 1/2-seconds! Paddle or Keyboard-advance frames.

**Unattended Shows** are optional with each picture arranged and pre-programmed to display from 1 to 99 seconds. **Text Screen Editor** lets you create black-and-white text "slides" and add type "live" from the keyboard during shows. **Mail copies of presentations** on disk to friends and associates (and home to Mom!).

(Includes Peaks & Pokes Chart)

## New! PRONTO-DOS ONLY 29.50

HIGH-SPEED DISK UTILITY  
BY TOM WEISHAAR

Put HIGH-SPEED DOS in your Apple's normal memory. Language Card or Apple IIe high-memory—

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
BLOAD LANGUAGE CARD	13 sec.	4 sec.

(TEXT FILES: No Change)

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with **all DOS commands**, G.P.L.E.\* and most of your programs.

Pronto-DOS will move DOS to your Language Card or Apple IIe's standard high-memory, giving you **10,000 Extra-Bytes** of programmable memory!

ProntoDOS also frees-up **15-extra-sectors** per initialized disk, almost one full track of disk space!

**PLUS:** Auto Free-Disk-Space, New "TYPE" Command displays Text File contents, and much more...

(Includes Peaks & Pokes Chart)

## ALPHA PLOT

ONLY 39.50

HI-RES GRAPHICS/TEXT UTILITY  
BY BERT KERSEY & JACK CASSIDY

**DRAW IN HI-RES**, on both pages, using keyboard OR paddles/joystick. View lines before plotting. Use mixed-colors and Reverse (background opposite) plotting. Fast hi-res circles, boxes and ellipses; filled or outlined.

**Compress Hi-Res Images to 1/3 Disk-Space.** Superimpose hi-res pages 1 and 2 or re-locate any rectangular image area anywhere on either hi-res page.

**Proportionally-Spaced Hi-Res Type** with adjustable character size and color. Upper and lower case with no htab/vtab limits. Sideways typing for graphs too.

(Includes Peaks & Pokes Chart and Tip Book #4)

**GOTO your local Apple Software Store for Beagle Bros products.**

If they don't have what you want, tell them to get on the stick by calling Beagle Bros (619-296-6400) or ANY Apple Software Distributor.



## TIP DISK #1

ONLY 20.00

100 TIP BOOK TIPS ON DISK  
BY BERT KERSEY

**100 LISTABLE PROGRAMS** from Beagle Bros Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are changeable for experimentation. Includes our **Apple Command Chart** featuring all Applesoft, Integer Basic and DOS Commands!

(Includes Peaks/Pokes and Command Charts)

## RUSH the following disks by First Class Mail—

- |   |   |
|---|---|
| <input type="checkbox"/> Alpha Plot ... \$39.50 | <input type="checkbox"/> Pronto-DOS ... \$29.50   |
| <input type="checkbox"/> Ap.Mechanic ... 29.50  | <input type="checkbox"/> Tip Disk #1 ... 20.00    |
| <input type="checkbox"/> Beagle Bag ... 29.50   | <input type="checkbox"/> Typefaces ... 20.00      |
| <input type="checkbox"/> DOS Boss ... 24.00     | <input type="checkbox"/> Utility City ... 29.50   |
| <input type="checkbox"/> Double-Take ... 34.95  |   |
| <input type="checkbox"/> Flex Text ... 29.50    | <input type="checkbox"/> Add me to mailing list.  |
| <input type="checkbox"/> Frame-Up ... 29.50     | <input type="checkbox"/> Already on mailing list. |

**AT YOUR APPLE DEALER NOW!**  
Or order directly from Beagle Bros—



Visa/MasterCard/COD, call TOLL-FREE

Nationwide: 1-800-854-2003 ext. 827

California: 1-800-522-1500 ext. 827

Alaska/Hawaii: 1-800-854-2622 ext. 827

OR mail U.S.Check, Money-Order or Visa/MC#  
to **BEAGLE BROS**, 18th-Floor  
4315 SIERRA VISTA, SAN DIEGO, CA 92103

Add \$1.50 First Class Shipping, Any-Size Order.  
Overseas add \$4.00. COD add \$3.00. California add 6%.  
ALL ORDERS SHIPPED IMMEDIATELY.

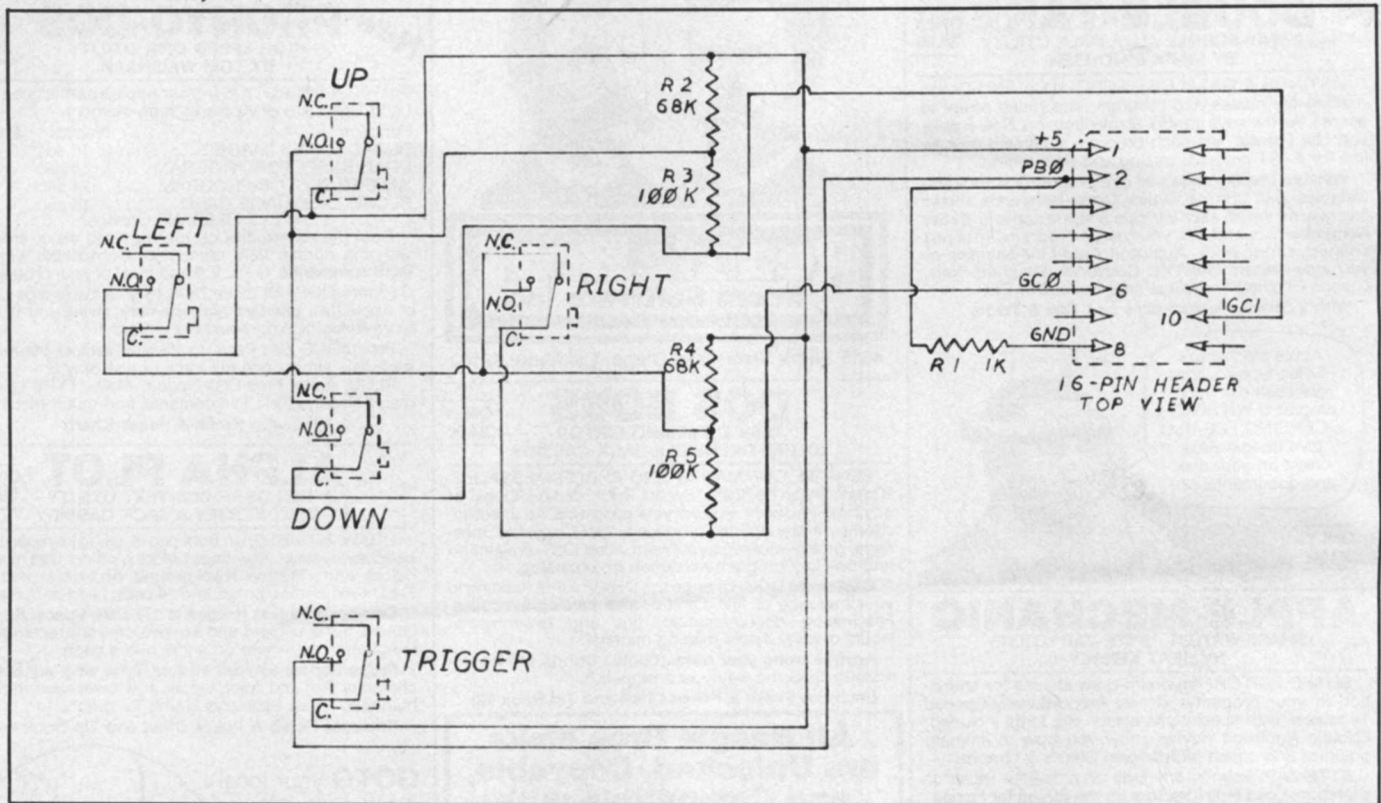


Figure 5. Microswitch Apple paddle.

with silicone sealant. Apply only a small amount of sealant and let it set for a few hours. (When you have completely checked out the joystick you can add more if necessary.)

Now turn the block over. Trim the wires short, but leave enough length to make the solder joints. Bring the main cable into the cavity and strip and tin all wires. Group all the common wires together, twist them, and solder the joint. Solder each of the five other two-wire joints, wrap each joint with a small piece of electrical tape, and press them all into the cavity.

Strip and tin all the wires on the socket end of the cable. Pass the cable through the hood and solder each terminal. It is easier to solder the socket if you clamp it upright in front of you in a small vise.

### Checking The Circuits

You can use a multimeter set on a low ohms scale to check the wiring. Place one lead on socket terminal 8 and with the other lead move in turn to terminals 1, 2, 3, 4, and 6. On each terminal, press all the switches to be certain that the correct switch, and only the correct switch, shows continuity when pressed. Examine the socket solder joints for solder bridges and cold joints covered with dark resin. Make any necessary repairs. Don't assemble the connector until you are entirely satisfied with your work.

### Test Run

Turn off your Atari. Plug in your new joystick and turn the system on again. If it doesn't start up in the normal way, turn it off immediately and recheck your work. Then run your favorite game to try out the unit. If you get crazy responses, you have probably wired some of the switches to the wrong connector pins.

### Finishing Up

When the switches work correctly, you can put the finishing touches on the new joystick. The hand grip unit could probably use more silicone sealant on the switches and on the main cable where it comes out of the block. In addition, you can fill the bottom cavity with sealant, cover it with a piece of plastic, and clamp or weight it to a flat surface. After the sealant has set overnight, peel off the plastic, trim any excess sealant, and glue cotton felt to the bottom with contact cement.

The tipping disk unit deserves some personalizing touches. First secure the switches, main cable, and cavity as above. Then try out different combinations of thickness of the foam cross and height of the tipping post and shape of its top until you get a response you like. You can even do without the post altogether, or you can eliminate the foam by gluing the disk to the post with silicone sealant. Use whatever combination

feels good and improves your speed. When you get the combination you like, glue the foam to the block and the tipping disk with contact cement.

### Atari Joystick Circuit For The Apple

If you own an Apple computer you may want to make an Atari-type joystick for playing games that require only limited directions. "Snoggle" and many other arcade games are more enjoyably played with Atari-type joysticks than with Apple joysticks because the former have faster response. The resistance values of the two potentiometers in such a paddle, however, are limited to "full on," "average," and "full off."

The construction of this joystick for an Apple is almost the same as it is for the Atari systems, except that you will have to make the bottom cavity slightly larger. Figure 5 is the schematic for wiring the unit. Note that two of the switches (down and right) use the normally closed (n.c.) terminal. The resistors R2, R3, R4, and R5 can be placed on a postage stamp size piece of printed circuit board and hidden in the cavity in the block. Resistor R1 can be placed in the header plug so that only a four-wire cable will be needed.

This circuit works by mimicking a pot, using two resistors and two switches. If you don't press a switch, the game control inputs see the 68K resistors and read approximately 128. If you



# Good reasons why you should subscribe to *Creative Computing*.



## It's the Number One magazine of computer applications and software!

There's one place you can always be sure of learning more about microcomputer software and applications: *Creative Computing*.

Every month *Creative Computing* provides you with a continuing education on everything related to microcomputers and computer equipment. Useful articles, "how to" tutorials, exciting new applications, games and "no holds barred" reviews of the latest software and equipment make up a major part of *Creative Computing's* editorial content.

We give you probing features on programming breakthroughs and important news. Plus in-depth articles on elementary, intermediate and advanced software and applications topics—to help you develop your knowledge and skills, save hundreds (perhaps thousands) of dollars in unneeded software, discover uses for your personal computer that you might never have considered. Articles that increase your overall "computer consciousness." Here's how:

### 1

#### ***Creative Computing* gives you things to actually do with a computer.**

Just owning a computer isn't enough. You've got to know what to do with it. That's why applications are our primary focus. Text editing, animation, graphics, business simulations, data base and file systems, music synthesis, control of household devices, communications, games—some of the applications and software you'll learn about in *Creative Computing*.

### 2

#### ***Creative Computing* discusses business applications in simple, nontechnical language.**

If you're a business person who needs to know about the latest developments in word processing and office applications, turn to *Creative Computing*. We clarify such business applications as investment analysis, futures evaluations, data base management, mailing list programs, text editing, word processing and simulations. And all the software available for business people.

### 3

#### ***Creative Computing* helps you decide which computer equipment is best for you.**

Our tough, no-nonsense equipment profiles arm you with the facts before you walk into a computer store. You'll know the right questions to ask and how to cut through the jargon and sales hype. We give you authoritative guidance in deciding what you need, what you don't need—and what's right for you and your pocketbook.

### 4

#### ***Creative Computing* covers computer education in depth.**

We started out as a computer education publication, and we're still committed to the educational community. We regularly carry articles on designing educational software, evaluating educational software, teaching concepts and terminology in computer education, text editing applications for literature and computer simulations in the classroom—plus a great deal more.

### 5

#### ***Creative Computing* brings you hours of mind-expanding game entertainment.**

We've got a soft spot for the computer game addict—and computer game software. We know you want to understand more about the new computer games flooding the market: which ones are easiest to learn? Require the most skill? Offer the most surprises? Give you the best graphics? Provide the most challenge? Contain a new twist? *Creative Computing* brings you the answers.

### 6

#### ***Creative Computing* features the state of the art.**

Columns on the most popular personal computers, a "software legal forum," letters to the editor. Reviews of books, games, organizations, dealers and events. Fascinating interviews with leading innovators, equipment designers, program developers and game inventors—men and women who'll give you a real glimpse of the future!

### 7

#### **Our price is right.**

By subscribing to *Creative Computing* now, you can save as much as 33% off the full subscription price. To learn elsewhere what you'll learn from *Creative Computing*, you might spend hundreds of dollars in course fees and books. Then you'd have to winnow out what you could use from all that you'd learned. But *Creative Computing* does that for you, so you'll have time to enjoy your own computing interests. And that saving of time makes this offer very inexpensive indeed.

**Join over 150,000  
*Creative Computing* readers  
by subscribing today!  
Just use the coupon  
at right.**

**SAVE UP TO 33%!**

**Creative Computing** • P.O. Box 5214 • Boulder, Colorado 80322

**YES!** Send me *Creative Computing* for:

- ☐ One year (12 issues) for \$19.97—I save 20%!
- ☐ Two years (24 issues) for \$36.97—I save 26%!
- ☐ Three years (36 issues) for \$49.97—I save 33%!

Savings based on full one-year subscription price of \$24.97.

Check one: ☐ Payment enclosed. ☐ Bill me later.

4N161

Mr. / Mrs. / Ms. \_\_\_\_\_  
(please print full name)

Address \_\_\_\_\_ Apt. \_\_\_\_\_

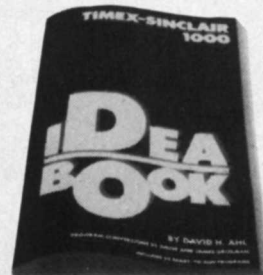
City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

# Discover the hidden power of your TS1000 and ZX-81

**The 50 ready-to-run programs in this book will show you how!**



If you suspect you're not getting all you can from your Timex Sinclair 1000, here's a new book that will make sure you do.

David H. Ahl has written 16 books about computers. In **The Timex Sinclair 1000 IdeaBook** he puts 25 years of experience to work—to help you put your computer to work.

**The Timex Sinclair 1000 IdeaBook** includes 50 complete, pre-tested programs—each one designed to illustrate a specific problem-solving technique.

By working these programs on your own computer, you'll understand more fully its hidden strengths. Plus, you'll learn how to overcome its inherent weaknesses.

Armed with this knowledge, you're ready to put your Timex to work performing a multitude of practical everyday tasks. Everything from balancing the family budget, to taking inventory, to performing science experiments.

Ten informative chapters show you how to solve problems using:

- Repetitive trial
- Convergence
- Recursion
- Compounding
- Probability
- Geometry
- Science
- Simulation
- Drill
- Practice

**The Timex Sinclair 1000 IdeaBook** is the only volume of its kind ever published for TS 1000 and ZX-81 owners.

**Order your copy today—  
and start taking full  
advantage of your TS 1000.**

**MAIL TODAY TO:  
CREATIVE COMPUTING PRESS**

Dept. HC7F • 39 East Hanover Avenue  
Morris Plains, NJ 07950

Please send me \_\_\_\_\_ copies of the **The Timex Sinclair 1000 IdeaBook** for only \$8.95 each, plus \$2.00 shipping & handling per book.

Total Amount \$ \_\_\_\_\_

☐ Payment Enclosed. (CA, NJ and NY, State residents please add applicable sales tax.)

☐ Charge my: (Charge and phone orders: \$10 minimum)  
☐ American Express ☐ MasterCard ☐ Visa

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

NAME \_\_\_\_\_  
(please print)

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

\*Outside U.S., add \$3 for shipping and handling.

☐ Check here to receive a FREE catalog of computing books, magazines and guides.

**For faster service, PHONE TOLL FREE:**

**800-631-8112**

(In NJ only 201-540-0445)

Also available in your local bookstore and computer store.



## Controller Corner, continued...

press the left (or up) switch, the game controls see zero resistance and read 0. If you press the right (or down) switch, the controls see 168K (68K plus 100K) and read full scale, 255.

Resistors R3 and R4 are not absolutely necessary, since the game controls read full scale when open, but it is easier to understand the circuit if they are shown. The stacked plug and socket we described in a previous article ("Multiple Socket Extensions," *Creative Computing*, May 1983) works very well with the Apple-adapted joystick.

## Summing Up

You can build joysticks for the Atari in a home or school workshop. The materials will cost you less than the purchase of a commercial joystick, and the great advantage is that you can personalize your joystick for the exact feel and action you want.

Next month we will show you how to build a pair of race car steering wheels. Using these controls makes auto racing programs much more realistic and opens up the prospect of software for two-person competitive racing. □

## Corrections

In our article, "Build an Airplane Controller For Your Computer" (*Creative Computing*, April 1983, pp. 244-259), the wiring shown in the schematic is inconsistent with the A2-FS1 Flight Simulator program mentioned in the article. The pot numbers are reversed. The unit can be made consistent with this program by reversing the wires going to pins 6 and 10 on the plug.

In "Rebuilding Game Paddles and Joysticks" (*Creative Computing*, February 1983, pp. 140-150), the last nine lines of Listing 1, Paddle Check Out, were omitted (page 149). These lines appear below:

```
296 GOTO 210
300 IF P0 > 127 THEN VTAB 10: HTAB
15: PRINT CL#
305 IF P0 < 128 THEN VTAB 10: HTAB
15: PRINT OP#
310 IF P1 > 127 THEN VTAB 12: HTAB
15: PRINT CL#
315 IF P1 < 128 THEN VTAB 12: HTAB
15: PRINT OP#
320 IF P2 > 127 THEN VTAB 14: HTAB
15: PRINT CL#
325 IF P2 < 128 THEN VTAB 14: HTAB
15: PRINT OP#
330 GOTO 210
999 END
```

We would like to thank the readers who pointed out these errors. We encourage you to keep writing to us with comments and questions.

## CLASSROOM SOFTWARE for the 16K TRS-80

Easy-to-use software for models I/III with tape, disk, or network. Complete manuals plus on-screen instructions. As simple as typing CLOAD and RUN.

Each program recorded twice on a separate side of a quality, long-lasting cassette.

**CLASSROOM PACKS.** Each has 4 programs in a subject area and permits self-paced study with unlimited running time. Choice of review or self-test modes plus progress reports and help feature. Missed questions are corrected and recalled until learned. **Price \$44.95 each.**

- Geography I
- U.S. Government I
- U.S. History I
- Driver Education
- Electronics I
- Music Theory I

Other outstanding cassette software:

- Logic Games Package ..... \$24.95
- Anagrams ..... \$19.95
- Scramble-Grams ..... \$19.95

**30-DAY GUARANTEE**

At local dealers or order direct.

## Educational Media Associates

Software Products

342 West Robert E. Lee

New Orleans, LA 70124

MC & VISA include card # and expiration date. Free shipping on prepaid and credit card orders. Others add \$1.50 per package.

**CIRCLE 171 ON READER SERVICE CARD**

## Happy Hands

Offers Discounts on All

## TRS-80<sup>TM</sup> COMPUTERS

We Have What You Are Looking For

**Free Shipping Within United States**

- 100% New Original Equipment
- Prices Comparable to Any Other
- No Tax On Out of State Shipments

For Prices and

Shipping Information

Call Toll Free

1-800-545-9019

N.M. Residents Call 257-7865

or write

HAPPY HANDS

P.O. DRAWER 1

RUIDOSO, NEW MEXICO

88345

**CIRCLE 183 ON READER SERVICE CARD**

## ATLANTIC COMPUTER ACCESSORIES

CALL OR WRITE FOR FREE CATALOG

<b>ADDS</b>	
A1 TERMINAL	518.00
A2 TERMINAL	546.00
<b>AMDEK</b>	
AMDEK I-13" COLOR MONITOR	310.00
AMDEK II-13" HI RES RGB COLOR MON	469.00
AMDEK III COLOR MONITOR	425.00
<b>ANCHOR AUTO AARS-232 DIR CON MODEM</b>	85.00
<b>AXIOM PRINTER</b>	199.00
<b>D.C. HAYES</b>	
HMICRO/T-P MICRO MODEMII W/TER PRO	309.00
HSMART SMART MODEM	215.00
HCRON CHRONOGRAPH	199.00
HMICRO MICRO MODEMII	275.00
H1200 SMART MODEM 1200	519.00
<b>EPSON</b>	
MX 80 DOT MATRIX PRINTER	CALL
FX 80 HI-SPEED PRINTER	CALL
<b>IBM</b>	
5 1/4" SS DD DISKS (10)	25.00
5 1/4" DS DD DISKS (10)	30.50
<b>MAXELL</b>	
MDI 5 25" SS/SD (BOX OF 10)	32.00
MDD 5 25" SS/SD (BOX OF 10)	41.00
MDD 5 25" DD/SD (BOX OF 10)	45.00
<b>MBI</b>	
I-C-MAGIC ROM FOR IBM	69.00
VIP CARD FOR APPLE	102.95
MONTE CARLO CARD GT	359.00
MONTE CARLO CARD QUATRO	319.00
APPLE TIME CARD	69.00
<b>MICROSOFT</b>	
SOFTCARD* Z80 CARD	CALL
MULTIAPP MULTI PLAN-APPLE	CALL
MULTIAPP CPM MULTI PLAN-APPLE CPM	CALL
<b>MICROTEK</b>	
64K RAM CD 64K MEMORY CARDS	199.00
128K RAM CD 128K MEMORY CARDS	295.00
80COL-CD 80 COLUMN CARD	169.00
DUMPLING-16K PARA INTRF W/16K BUF	163.00
Q DISK 128K W/DISK EMULAT FRMWR	329.00
<b>MICROWARE DIST</b>	
GRAFIT APPLE GRAPHING PROGRAM	21.95
PERFORMR PRNTR ENHNC USE W/PAR CD	38.90
<b>NOVATION</b>	
CAT-ACUSTIC MODEM	149.00
J CAT DIR CON 300 BAUD MODEM	119.95
<b>OKIDATA</b>	
M83A MICROLINE 83A PRINTER	CALL
MICRO80 MICROLINE 80 PRINTER	CALL
M82A MICROLINE 82A PRINTER	CALL
2350P HIGH SPEED PARALLEL PRNTR	CALL
92 160CPS PRINTER	CALL
93 WIDE CARRIAGE 160CPS PRINTER	CALL
<b>PANASONIC</b>	
CT-160 COLOR MONITOR	299.00
TR-120-MIP HI-RES GREEN PHOSPHOR	159.00
<b>QUANTEX 7030 MULTIMODE PRINTER</b>	1634.00
<b>SMITH CARONA TP-1</b>	CALL
<b>TAXAN</b>	
VISION I RGB MON	317.00
VISION III HI-RES RGB MON	529.00
<b>TALLY MT-160</b>	CALL
<b>TELEVIDEO</b>	
910 TERMINAL	620.00
925 TERMINAL	778.00
970 TERMINAL	1145.00
<b>TG PRODUCTS</b>	
JOY STICKS	47.00
PADDLES	32.00
<b>TYMAC PARALLEL INTERFACE/CABLE</b>	99.00
<b>ISI INTERNATIONAL</b>	
P12 12" GREEN PHOSPHOR MONITOR	159.00
P13 12" AMBER PHOSPHOR MONITOR	175.00
<b>VIDEX</b>	
VIDEX1 80 COLUMN CARD	CALL
VIDEX5 ENHANCERII	CALL
<b>WABSH M11A411X 5.25" SS/SD DSK (10)</b>	20.99

**CALL for MONTHLY SPECIALS and CURRENT LOW PRICES.**

Prices subject to change. Fla. residents Add 5% Tax.

**FREE SHIPPING - Payment w/order**

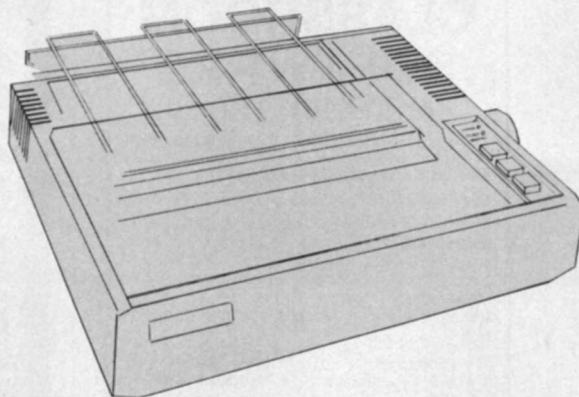
Se Hablas Espanol. over \$100.00.

**1-800-327-8020**

**1-305-972-5399**

**6951 N.W. 15th Avenue  
Ft. Lauderdale, FL 33309**

**CIRCLE 111 ON READER SERVICE CARD**



# ...print about printers...

Well folks, this is it. A monthly column devoted solely to printers and print products for microcomputers. It has been a while in coming, but we will now present an ongoing forum to discuss the state of the microcomputer printer art, as well as other developments concerning the processes involved in obtaining hard copy.

## Creating a Forum

Because the situation with printers is so fast-changing and volatile, the occasional *Creative Computing* hardware review does not really provide the kind of continuity of market understanding that supports an educated buyer. Dramatic new features and substantial price cuts continually combine to make choosing a printer a tricky project. Perhaps through a column such as this, a better sense can be communicated of where the market stands and where it is headed.

## Silencing the Scribe

Another advantage of this format is the opportunity to get some two-way communication going. It is important that individuals and companies that take issue with judgments presented here have a chance to respond. Here is a good example:

Anadex is still rather miffed over my treatment of their Silent/Scribe DP-9620A. In June I tried to make some amends, admitting I was wrong about the printer requiring a slotted printer stand, and noting that the unit was indeed the quietest impact printer we tested.

Kevin A. Mathews of Anadex was still not happy. "Concerning noise levels, the only proper way to measure the noise level of a dot matrix printer is in a semi-anechoic chamber," he said. An outside consulting firm came up with a figure of 55 dB, while we got a reading of 64 dB.

## John J. Anderson

Well this has forced a re-evaluation of our noise level tests. I tried to be very clear in March that the numbers we indicated should be used for *comparison* only. And since I know of very few people who keep their printers in anechoic chambers, I do not feel too bad about our measurement standards, as they reflect *real world* conditions. Mr. Mathews questions whether we had the unit on a mat of acoustic foam. If he had read the piece closely, he would have learned that we did.

He also took issue with our labeling the 1.5K buffer of the unit as "surprisingly small." Certainly if the user has an external buffer of the kind we shall examine below, this spec will be of little concern. I still feel that 1.5K is a bit skimpy, but should note that the Anadex buffer can be expanded to 3K.

This is about all that remains to be said on the evaluation revision of the Anadex DP-9620A, except perhaps to reiterate that it is, indeed, an *excellent* printer, which I said originally. I remain convinced, however, that its price is less than fully competitive. If it listed for \$1445 instead of \$1845, it would have merited more than two stars.

And about this star system: is it worth the aggravation? I have dozens of letters taking me to task for my star ratings on various machines. Perhaps star ratings and noise level tests should be jettisoned entirely. It would certainly make my job easier. Let us know how you feel on these topics—and on any others you feel merit consideration.

Another advantage of a printer column as opposed to product reviews is the possibility of casually examining printer ac-

cessories. We shall make that a regular part of our discussion, rest assured, and shall begin on that task right now.

## In the Buffer

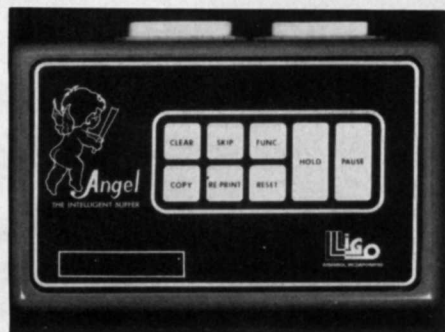
Probably the most practical and potentially useful tool to add to your printer is a buffer. This, simply stated, is a type of RAM board used to temporarily store data for eventual output to a printer. By uploading data to a buffer, your micro will not have to wait for the printer to finish its job before returning to you for further commands. It can dump data to the buffer at a very efficient rate of speed, then return to your control, while the buffer then dumps data to the printer at whatever rate the printer can handle. The slower your printer, the more dramatic the time saving, of course.

If, like me, you generate many long documents for printout, waiting around for hard copy can be a big waste of time, even at 160 cps. I swear by the 64K in-line Microbuffer I am now using. With even the longest documents, it returns the computer to me after only a few minutes, and I can get back to work while my printer pumps out hard copy for the next half hour.



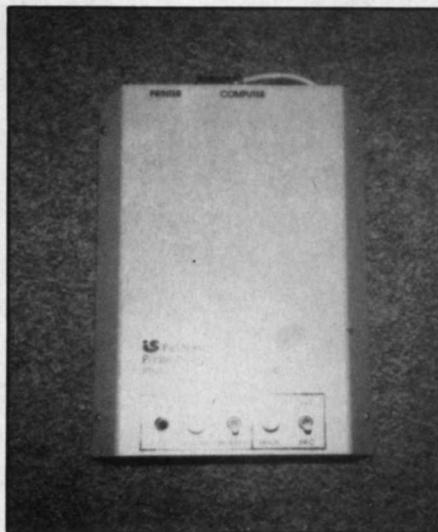
*The Microbuffer In-Line, from Practical Peripherals.*

For more information, contact Practical Peripherals, Inc., 31245 La Baya Dr., Westlake Village, CA 91362. (213) 991-8200.



*The new Angel buffer.*

Another, similarly priced unit is offered by Ligo Research in Illinois. The Angel Buffer not only offers all of the features of the Microbuffer, but will accept serial input for parallel output or parallel input for serial output. This handy feature would have been invaluable to us when we were testing over a dozen very varied printers last March. If you have parallel vs. serial compatibility problems with your computer and printer, this product can solve them while providing the convenience of a print buffer.



*The Pipeline buffer.*

The Angel unit can be upgraded to a maximum of 128K, but is shipped with 64K. For \$295, that is a good buy. As it is brand new, we have yet to see a unit at the lab. I cannot, therefore, make a judgment on the Angel buffer, other than to say that on paper, it sounds pretty good. Ligo Research Inc., 396 E. 159th St., Harvey, IL 60426. (312) 331-8797.

One buffer we *have* had a chance to play with here is the parallel Pipeline Random Access Printing Buffer, from Interactive Structures (the people who brought Apple owners the Pkaso printer interface). This is touted as the first "intelligent" microcomputer buffer device. In addition to conventional "dumb" buffering, a "random access printing" feature is offered, wherein labelled data can be stored in separate buffer compartments, then printed in any specified order any number of times.

This capability makes it easy to combine output from different programs—text with spreadsheet data, for example, perhaps augmented by graphics charts, directly from the buffer. Even Pipeline commands themselves can be stored in Pipeline “buckets” to control in turn other Pipeline operations. The unit comes with 8K, but is expandable to 128K. I should think that more than 8K would be required for any truly practical “intelligent” buffering.

The Pipeline buffer with 8K lists for \$195. Contact Interactive Structures Inc., 146 Montgomery Ave., Bala Cynwyd, PA 19004. (215) 667-1713.

Another unit we like very much is the Quadram MicroFazer (see complete review on page 64, March '83 issue).

The low end of the printer market is now teeming with so-called "fully featured" machines. By "fully-featured," most manufacturers mean machines with 80- or 132-column capability, tractor or friction feed, and an acceptable dot matrix print quality, with true descenders at quite a low cost.

One of the recent entries to this arena is the Gemini-10 from Star Micronics. It is an 80-column 10" carriage machine with a pleasing Epson-like 9 X 9 dot matrix font, capable of producing proportional, expanded, and italicized characters in three pitches. It features dot-addressable graphics capability as well. The claimed speed of the unit is 100 cps, with a feed speed of 10 lines per second. In actual use, I calculated the overall speed of the printer at about 65 cps, which is not bad at all for a printer of this category. The printer provides for single sheet friction feed and is relatively quiet.

In about a week of hard use, the Gemini-10 held up very well. Its companion 15 1/2" carriage 132-column model, the Gemini-15, was in use at a sister publication for about the same length of time, and also performed quite well. The larger machine is also capable of bottom-loading, which its smaller brother is not.

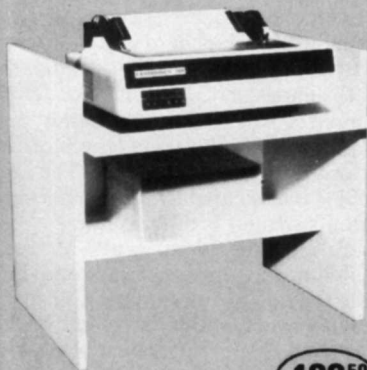
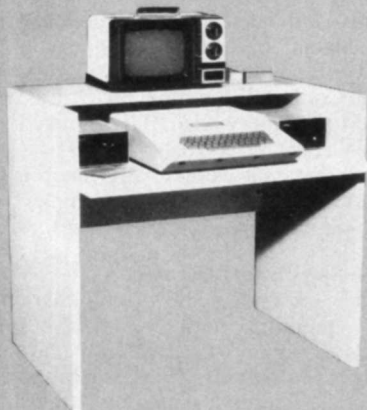
Both machines come with Centronics parallel interfacing standard. Serial interfacing is available as an option.

It is really unfair to fault low-end printers for being "plastic," as was pointed out repeatedly to me after the March printer round-up. If not for the miracle of plastics (shades of "The Graduate"), low-end printers would not exist at such low prices. Still, it must fairly be said that the Gemini-

*Gemini-10 print sample.*

[illegible]

# Its inevitable!



**\$129.50**

It's inevitable. Sooner or later you will realize that a desk or a standard table has not been designed for your micro-computer. From an ergonomic aspect, you are actually punishing yourself. At M.F.S. we specialize in **computer tables** and our Model II expresses our concept of dedicated design at an affordable price. In a neutral almond colour Melamine, the Model II will blend equally well into a home or office environment. It's flexible enough to accommodate most micro-computers or printers in your home or office. And should you change your hardware our hardware permits re-configuration to any of the above versions in a matter of minutes. At **129.50** it's not an expense, it's an investment.

**Dimension** (o.a.): 33 1/4" W x 27 1/4" D x 32" H.  
**Surfaces:** Melamine, thermofused to 1" substrate.  
**Shipping:** 2 cartons, total 92 lbs. (Unassembled, requires screwdriver only).

To order yours send certified check or money order to: **M.F.S., P.O. Box 266, Rouses Point, N.Y. 12979** (Don't forget your full name, address and Zip.)

\*Price is F.O.B. Highgate Springs, VT. 05241. Freight UPS collect. Please allow 3 to 4 weeks for delivery.

# SELL CREATIVE COMPUTING IN YOUR STORE!



- Big profits on sales
- We pay shipping

Minimum order 8 copies per issue.

**FOR DETAILS, CALL COLLECT:  
LYNN KUJAWA  
(212) 725-7679**

**AHL COMPUTING, INC.**  
A SUBSIDIARY OF ZIFF-DAVIS PUBLISHING COMPANY

## ZENITH APPLE EPSON ATARI V20

Computer		Printer interface	
Epson HX-20	850	for most computers	
Zenith	call	serial	25
		parallel	37
Monitor			
Zenith green 12	119		
Comrex color 13 in	395		
Comrex RGB 13 in	529		
Printers		Software for business	
MX80III	525	Zenith 8 or 16 bit	269
FX80	695	Peachtree GL AP AR ea	199
		Supercals	199
		Wordstar	269
		Datastar	199
		Multiplan	179
Disk drives		GL for HDOS	
Rana elite one	349	Inventory for HDOS	69
Rana elite two	499		
Rana elite three	699		
Controller	109		
Zenith Z87-89 dual dr	949	Apple	
Zenith Z87-90 dual dr	949	broderbund payroll	296
		GL with Payables	389
		Accounts receivable	299
		On-line screenwriter	88
VIC 20			
Video pak 64k	355	Writer professional	137
Video pak 16k	177	CP/M-86, Rainbow, IBM PC	
Video pak 80	159	Xerox, Superbrain, Northstar	
Video pak z-80	269	Osborne I, Victor 9000 etc	
Memory cart. 16k	79	Calstar	119
Expansion chassis	49	Datastar	219
Micro expand chassis	39	Infostar	369
Video cable VIC20	19	Mailmerge	189
Video cable Com64	21	Spellstar	189
Wordmaster	79	Supersort	189
Printer interface	68	Wordstar	349
		wordstar + Mailmerge	469
		wordstar + Spellstar	499
		Word + Spell + Mail-Star 629	
		GAMES !!!	
		Apple ATARI V20	
		Choplifter	26
		Serpentine	26
		Track attack	22
		and much much more call	
MICROSOLAS INC			
4787 Kingsway BBY			
Vancouver BC V5H 2C6			
8-5.50 Phone 604 433 4685			
after store hrs 433 6043			
ALL US \$ Check, money order.			
Add 3% for M. card or VISA			
Shipping \$2 for software			

CIRCLE 241 ON READER SERVICE CARD

## Printers, continued...

10 falls in the category of "very plastic" printers, not very likely to gracefully survive being knocked off a desk and onto a concrete floor. I am not faulting the printer on this account; I am merely warning owners and potential owners not to drop the machine onto a concrete floor. (It shouldn't be so difficult to avoid, except on the premises of and under the conditions prevailing at *Creative Computing*.)

The Gemini printers are capable of all the print modes we have come to expect: super/subscript, underlining, backspacing, double strike and emphasized. Star Micronics claims a mean time between failure rate of 5 million lines, and a print-head life of 100 million characters. They offer a 90-day warranty on ribbon and printhead, along with a six-month warranty on the rest of the machine.

In addition, the machines come with a standard buffer of 2.3K, expandable to 6.3K. A buffer of that size is quite practical. Are you listening, Anadex?



The Gemini-10 printer.

These facts are especially impressive when you consider that the list price of the Gemini-10 is \$399, and of the Gemini-15, \$649. I have noticed substantial discounts on these prices in several computer magazines, so shop around.

Both machines qualify for another category of mine: Epson look-alikes. They look, sound, feel, and operate like Epsons, and the controls on the machines are nearly identical with those on the MX-80 and MX-100. One gets the feeling that they must be assembled down the block from the Epson plant in Osaka.

But if any printer design should be copied, it is the Epson. And Star Micronics has done a very good job, and managed to price it even lower. If you are looking for a low-end printer, have a look. Star Micronics Inc., 1120 Empire Central Pl., Suite 216, Dallas, TX 75247. (214) 631-8560.

August 1983 © Creative Computing

CIRCLE 239 ON READER SERVICE CARD

# SNAVE



# SYSTEMS



## ACE 1000

- Apple II compatible
- 64K of RAM
- Upper and lower case
- Typewriter-style keyboard
- 12-key numeric pad
- Alpha lock key
- VisiCalc® keys
- 50-watt power supply
- Built-in fan
- W/Color

## ACE 1200

- Color
- 128K of RAM
- Upper and lower case
- Serial and parallel interfaces
- Cursor key pad
- Numeric key pad
- Alpha lock key
- VisiCalc® and CP/M keys
- 50-watt power supply
- Built-in fan

Bring us your best price,  
and we'll **BEAT IT!**

And, we take trade-ins. **CALL . .**



## We Have APPLES

### APPLE IIe Starter System Includes:

Apple IIe  
disk drive & cont.  
Apple III monitor  
80 col. Card  
Stand  
4 - Month Replacement Warrantee

Low  
Low Low Lower  
Low **Price** Lowered  
Low Low Lowest  
Low

~~RETAIL  
1995~~

**CALL  
for our  
price**

We'll Ship Anywhere.  
Won't Be Undersold.  
Fully Tested - If Desired.

Yes, we take trade-ins!

### Awesome Prices on:

#### Printers

C-Itch  
NEC  
Okidata  
Smith Corona  
Gemini

#### Monitors

Amdek  
Sanyo  
NEC  
Taxan  
USI  
Electrohome

#### Modems

Hayes  
Novation  
Anchor

#### Disk Drives

Micro-Sci  
Rana  
Vista  
Corona

And 100's More - **Just Call!**

We Carry Everything  
for Apple and Franklin.  
(others too)

## JUST ASK

And Remember . . . . .  
Bring us your best price  
and we'll **BEAT IT.**

# SAVE up to 50% off

- Lowest Prices
- Fast Service
- Best Selection

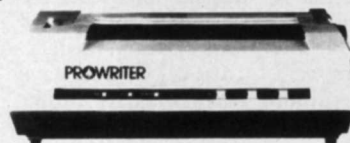
\*If you find any lower prices  
we'll **beat** them.

### Questions people ask.

- Q: Can anybody buy from Snave?  
A: Anyone who wants to save money.  
Q: How can you give such Great prices?  
A: Volume and Friendly Dependable Service.  
Q: Does Snave back-up what they sell?  
A: Always.  
Q: Is it true you will beat anyones price?  
A:

# YES!

### The Hottest little printers in the world.



**Prowriter \$393**

**Gemini 10 \$359**

### Interfaces:

Grappier + \$144  
Pkaso \$149  
Tymac \$97 w/printer

Fly Board Interface \$130    System Saver \$59.95  
Kraft Joystick \$39.95    Ultima II \$36.95  
Microsci 2nd Drive \$262    Word Scrambler \$17.95  
Crossword Magic \$24.95

**SNAVE SYSTEMS**  
Post Office Box 957  
Niles, Illinois 60648-0957

## 312/966-4505

**VISA®**



We accept VISA and MASTERCARD (Include card # and exp. date).  
Money Order, Certified Check, Personal Check (allow 10 days clearance).  
Add Only \$2 for delivery, (hardware and foreign extra).  
Illinois residents add 6% sales tax (except on software).  
Prices and policies subject to change.

## FREE Catalog

Apple, Apple IIe, Apple III, and Franklin are Registered Trademarks.



# apple cart...apple cart...apple c

This month's column will be a bit different from recent "Apple Carts." No applications this month. Instead, we'll look at some new products for the most forgotten Apple, the Apple III, talk about the Apple IIe, review two books and offer a program that will let you peek inside the heart of your Apple.

The success of the Apple II was due less to the genius of Jobs and Wozniak than to the gigantic software base quickly built around the machine. The number of programs, the variety of peripherals and accessories and the information, support and dealership network grew rapidly and guaranteed success for the Apple II. There was always someone or someplace to fall back on for help and guidance.

When Apple introduced the Apple III, it was to fill the perceived need for a "business" machine to complement the II—the "hobby" machine. Sales were not as large as expected for several reasons. First, the applications software base wasn't very large. Second, user information was almost non-existent. Some users were turned off by problems caused by running II software (or rather by the software *not* running) on the III.

And who can forget drop-testing the III? Very few users could put up with a machine that had to be lifted and dropped a few inches to reseal the ICs. Apple has improved on the III, made more technical information available to users and tightened quality control which seems to indicate that the III is here to stay. Certainly peripheral manufacturers are beginning to believe that the Apple III is a viable computer. The products introduced at the Anaheim Applefest attest to this.

## Need More Storage?

One complaint about the III was the lack of high-capacity disk storage at a reasonable price. Micro-Sci produces three 5-1/4" drives that are fully compatible and relatively inexpensive. The A3 replaces factory drives, giving 140K storage. The A73 more than doubles capacity at 286K. If you need more stor-

## Stephen Arrants

age, the A143 has a storage capacity of 573K. These drives may be daisy-chained and used in any combination.

If you need an 8" drive, say, for running the industry standard CP/M, Burtonix markets the Floppycard III. Allowing the III to handle single- and double-density 8" disk drives and the Amlyn Cartridge Floppy drive, this card is compatible with Apple III Basic, Pascal, and CP/M. Up to 4.4Mb of storage is accessible. Also offered is the Model A#-121, which includes two double-sided double-density drives and the interface card, and the Model A#-122 offering the Amlyn cartridge system.

Need even more storage? Corvus Systems has a new Winchester system for the III. The Model 6 offers an unformatted capacity of 6.7Mb, 5.7Mb formatted. The Model 11 has a capacity of 14.0Mb unformatted, 12.1 Mb formatted. If you really need storage space, the Model 20 allows 21.0Mb of unformatted storage and a gigantic 18.4Mb of formatted storage. Definitely not for your average user!

## I/O

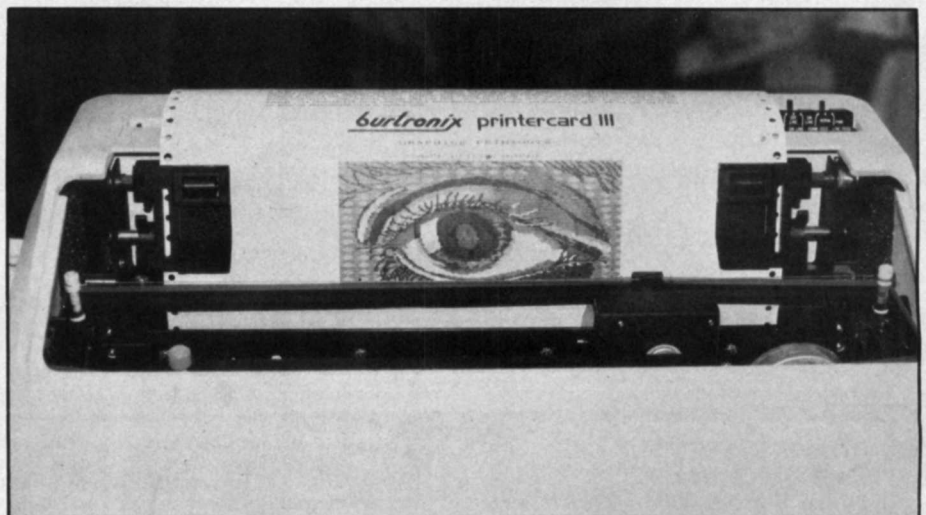
One area usually neglected is printer cards. For handling Centronics type printers, Burtronix has developed a card that can handle full-color graphics dumps to the IDS Prism printer. Up to now, the Pkaso III card from Interactive Structures was the only card capable of performing this magic.

Do you need a parallel card without graphics, but with lots of power? A new board from SSM, the APIO-III has both serial and parallel outputs. It also boasts RAM/ROM capability and it will let you attach almost anything to your III. SSM also has the ASIO-III, a serial-only card with the same features. Both of these boards leave the internal RS-232 port of the Apple III free for other uses.

For users seeking a parallel card with an on-board buffer, Wesper Micro Systems offers the Wizard-BPO board, which has both parallel and serial outputs and a 16K (expandable to 32K) buffer.

Two new plotters were introduced at the show. The Sweet-P from Enter Computer is low cost and high quality. The trade-off is that pens must be changed manually.

At a higher cost, the Model 84 from



Sample output from the Burtronix Printercard III.

**YOU  
CAN MAKE  
A FORTUNE  
IN MICROS!**

# THE MICRO COMPUTER BUSINESS WILL GROW FROM \$10 TO \$100 BILLION IN THE NEXT EIGHT YEARS! ARE YOU READY TO CASH IN?

The micro computer business is predicted to grow from its present \$10 billion to \$100 billion before 1990! Imagine the possibilities this opens for you! No matter where you live, if you're starting up or presently in business, no other industry offers you more opportunities!

Now, finally, all the inside information you need to secure a prosperous future in this dynamic industry is available in one place - **THE COMPUTER ENTREPRENEUR MANUAL!** - An immense information source, compiled by our inquisitive research team, aided by a panel of experts and business people from all areas of the computer industry!

We present the inside story of more than 100 lucrative computer businesses you can enter, where you'll find the real opportunities for the eighties: from one man operations like Programming Author, Word Processing Center or Consulting, to Systems House, Service Bureau, Computer Store etc! Many at little or no investment! All the invaluable facts and figures: How to start, Capital needs, Profit estimates and Margins, How to Sell and Market, How missing technical or business experience need not stand in your way, Source of Suppliers, etc! Details that could take years to find out on your own!

We'll show you inside tricks, like how to never again pay retail for computer products and consumer electronics, even for one item - right now, while you're starting your business! How to get free merchandise and trade show invitations, etc. This alone will more than pay for the manual! You'll read actual case histories of other computer entrepreneurs, so you can learn from their mistakes, and profit from their success stories! Where you'll be one year from now depends on your actions today! Let us show you how to take the first crucial steps!

Order now and take advantage of our limited introduction special, **THE COMPUTER ENTREPRENEUR MANUAL**, and a six month subscription to **THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER** (so you're always up-to-date with the industry), both for only \$29.95! You must be convinced on how easy you can strike it rich in the micro computer business - or you may return the manual for a full refund within thirty days! **USE OUR TOLL FREE NUMBER TO ORDER!**

## EVERYTHING YOU NEED TO KNOW TO SUCCEED IN THE COMPUTER BUSINESS IS ALL IN THIS MANUAL!

**THE COMPUTER ENTREPRENEUR MANUAL** has the answers to all your questions about selecting, starting and successfully running a computer business! There has never been such a comprehensive collection of know-how and information about this business in one place! All the facts you need to plan and achieve your goals in easy-to-follow, step-by-step instructions!

These are some of the 100-plus businesses covered in **PART ONE** of the manual, with the facts on how to start and run, Start-up Cost (Even how to operate on a shoestring), What profits to expect, Wholesale prices, Mark-ups, Suppliers, future outlook, case histories for each, etc:

Systems House, Software Author (who to sell to and who to avoid), Service Bureau, Software Publisher (How to find programs that sell, Word Processing Service, Consulting and Consultant Broker (use your skills or those of others, make \$150 - \$1000 a day!), The incredible Games Business, Computer Store (Franchises: Pro and Contra, or a low inventory store in your home!), OEM, Hardware Mfg, Data base and Teletext Service (big prospects!), Used Computers, Repairs, Rent-A-Computer, Promote Fests and Trade Shows, Turnkey Systems,

Bartering, Mail Order, Compile and rent mailing lists, Specialized Data Headhunting and Temp Help Service, Tech Writer Shop, Custom Engineering, The highly profitable Seminars and Training Business, and many more!

Many new ideas and ground floor opportunities! Interviews and success stories on companies of all sizes! Privy info on the profits made: How some computer store operators net \$100 - \$250,000! Little known outfits that made their owners millionaires, one of these low-key companies, making simple boards, went from nil to \$20,000,000 and 100 employees in four years! Programmers that make \$300,000, Thousands of micro millionaires in the making, etc!

Whatever your goal is - Silicon Valley Tycoon, or just a business at home - we guarantee you'll find a business to suit you - or your money back!

**PART TWO** of the manual is loaded with the know-how and "streetfighting" savvy you need, both as a novice or business veteran, to get started, to stay and to prosper in the micro computer business! A goldmine of information in clear and easy-to-use instructions: How to prepare your Business Plan, Outside financing, The mistakes you must avoid, How to hire and manage employees, Incorporation (when, and how to do it cheaply), Surviving bad times, Record Keeping, how to estimate your market before you start, Use multiple locations to maximize profits, how to promote and stay steps ahead of the competition! How to get free advertising, free merchandise, free advice, Power negotiating with suppliers to double your profit margins, etc! Even how to keep a present job while starting a business part time!

Don't miss this opportunity to be part of this great industry - the next success story could be your own! Order the manual today! Part one and two, bound in a deluxe ring binder, where you can also collect our newsletter (free for six months with the manual - a \$32.50 value!) - all for only \$29.95!



### THE COMPUTER ENTREPRENEUR NEWSLETTER - ALL THE LATEST INSIDE BUSINESS NEWS! NOW! SIX MONTHS FREE WITH YOUR MANUAL!

You're always attuned to the industry, and your manual kept up-to-date, with our newsletter! Each issue has the latest business news, ideas, new suppliers, our indispensable "watchdog" column on profits, discounts (don't miss mfg's promos, like recently, when top video monitor sold at \$80 - that's half wholesale, one third of the retail price!), the competition, the big deals, etc! Feature stories with start-up info and case histories on new micro businesses!

You'll get invitations to trade shows and conventions, the usage of our advisory service and our discount buying service for your purchases!

You'll find many items in our newsletter that will save you the cost of your manual many times over!



**CALL TOLL FREE!  
CHARGE IT!  
Credit Card Orders  
(MC, VISA only)  
accepted 24 hours/day  
1-800-227-3800  
Ask for extension 1135**



Order by phone (Credit cards only), or use the coupon:

Mail to **THE COMPUTER ENTREPRENEUR PUBLISHING CO.**  
PO BOX 456, Grand Central Station, New York, N.Y. 10163

Please send me **THE COMPUTER ENTREPRENEUR MANUAL**, and the six month free subscription to **THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER**. All for only \$29.95, plus \$3 for postage/handling (NY residents: add \$2.64 for sales tax). If I decide not to keep the manual, I may return it within 30 days for a full refund.

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

☐ Check or M.O. enclosed Charge to ☐ VISA ☐ MC

CARD #: \_\_\_\_\_

Exp. Date: \_\_\_\_\_

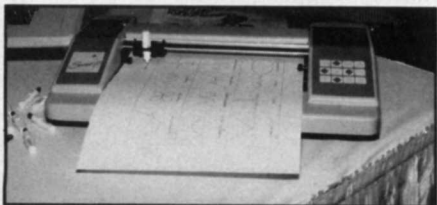
SIGNATURE: \_\_\_\_\_

CR0883

## Apple, continued...

CalComp is fast, quiet, and extremely powerful. It can change automatically up to eight pen colors while plotting. Consider this model if your needs include detailed scientific or engineering applications.

Southern California Research Group now provides Extend-A-Slot and Switch-A-Slot for the Apple III. Extend-A-Slot is a ribbon cable and edge connector combination that allows signals from the III to be brought outside the case for easy access. Switch-A-Slot, using a switched external card slot, increases the number of available slots by four.



The Sweet-P plotter.

Afraid of thieves walking away with your precious machine? The Anchor Pad from Anchor Pad International may help you sleep more soundly. You can lock your III to any large, flat object for security. Choose the spot carefully, however. Once the base is installed, it is there *forever*.

If you are tired of running "serious" programs on the Apple III and want an exciting session of *Choplifter* or *Wavy Navy*, Micro-Sci has the Gameport III. You can now use Apple II game controllers and game software on the III.

### Apple III Software

Software selections were, as usual, scant. Apple III owners have gotten used to this. With such a large market, you would think that software publishers would write for the Apple III.

Applied Technology has published *Versaform*, a form generator for businesses.

*Copy II Plus*, one of the most popular programs for the Apple II now can be used on the Apple III. Central Point Software states that the package will back up almost all Apple III software.

*Catalyst* and *Discourse* from Quark Engineering are two utility packages for Apple III Profile hard disk users. *Catalyst* allows booting from Profile, and lets you switch from one application to another with a single keystroke. *Discourse* stores printer output on the Profile, letting you use the computer for other work.

Also present were the Apple III's, an excellent user group. This is the place to find information on the III. If you are serious about the III, contact this group.

### Ile Upgrades

If you bought an Apple IIe with the Revision A motherboard, you won't be able to take advantage of the 560 by 190 super high-resolution graphics. Since the software needed to generate these graphics isn't available, the revision is unnecessary at present. If you really want a Revision B motherboard, your dealer will install it for free. There's a catch, of course. You must prove that you have Apple's 80-column Extended Memory Board to get the free upgrade. In the future, owners will have to pay for labor charges, but not for parts.

Some Apple dealers are offering a special "trade-up" to the Apple IIe. For about \$500, you can walk in with an Apple II or II+ and walk out with a IIe. Is it worth it? If you have a lowercase adapter, an 80-column card, and other enhancements, the trade-up may not be worth it, but if you're like me, you want the newest model. I had an Apple II with non-Autostart ROM. I removed all my enhancements and improvements, sold them to other Applers and traded. So, for about \$250 I had a brand new Apple IIe complete with manuals and warranty. What happened to my old Apple? It was cleaned and sold to someone wanting an Apple at a low price.

How is the IIe selling? Apple reportedly is producing about 40,000 units per month. Waiting time at some dealerships is *one month or longer*. Obviously Apple has a monster machine on its hands. Almost totally hardware and software compatible with earlier II models, the IIe has dropped right into a well-defined, ready-made market. So kudos to Apple for doing an excellent job.

### Tutorials And Books For The Apple

Apple also deserves congratulations for changing the instruction and reference manuals. The production and design of the new series is first-rate—something rare in the world of micro-computing. These are the first manuals that recognize that not everyone wants to be a "techie." *The Applesoft Tutorial* has been rewritten, and a tutorial disk is included.

*The Applesoft Basic Programmer's Reference Manual* offers excellent programming techniques useful to both the beginner and the long-time user. I recommend getting it even if you don't own an Apple IIe. Much of the material is useful for II+ owners.

#### Listing 1.

```
10 HOME
20 K = 65535: REM      K = TOTAL RAM IN YOUR SYSTEM
30 FOR LOC = 0 TO K
40 PRINT CHR$( PEEK (LOC));
50 NEXT LOC
```

There are probably more third-party books published for Apples than for any other micro. You can get a book on data files, game design, DOS, or meditating with the Apple (I'm not kidding). Some are helpful; most are confusing; and a very few are worth the money spent.

*Apple II User's Guide* (Osborne/McGraw Hill) by Lon Poole with Martin McNuff and Steven Cook is an extremely valuable book for anyone using an Apple. This should be the first thing you buy after getting the Apple. Don't even buy software. This book assumes that you have no knowledge of computing and leads you through concepts such as programming in Basic, graphics and sound, disk organization, and using the Monitor. Included is a glossary of Basic statements, functions and error messages. An excellent set of appendixes rounds out this book.

One book no serious Apple user should be without is *What's Where in the Apple—A Complete Guide to the Apple Computer* by William F. Luebbert, published by Micro Ink (Chelmsford, MA). This book is *not* for the beginner. You'll need some prior programming experience to understand all the topics Dr. Luebbert covers. In addition to covering PEEKS, POKES, CALLS, and other difficult concepts, *What's Where in the Apple* lists and describes more than 2000 memory locations, including the names and locations of different Monitor, DOS and Basic routines. It's expensive (\$24.95), but as you gain more programming experience, you will find this an invaluable resource. One note—with the introduction of the Apple IIe, some sections of *What's Where in the Apple* are incorrect. Until a revision comes out, be careful what you PEEK, POKE or CALL.

### Short Program

Well, that's about it. To wrap things up, here is a short program that doesn't seem to do much. Actually, it is very powerful. This program will let you look at each RAM location in the Apple. To see what might be in memory, run it after running other programs. Try it after *RUNNING* or *BRUNNING* programs from the System Master. A lot of what you'll see will look like garbage, but if you look closely, you will recognize parts of programs, DOS commands, and other interesting tidbits. Don't worry about running this program—you can't crash

the system by just looking around. Remember to set K to the total amount of RAM present in your Apple. Just multiply 1024 by the number of "K" (48 or 64), subtract one and what you have is the value for K.

Next month, more new products, reviews of some utilities you should have, and a simple method of recovering lost files.

A special thanks to Paula and William Purpura for providing information from the Anaheim Applefest. □

#### Firms Mentioned In This Column

CalComp  
2411 West LaPalma Ave.  
P.O. Box 3250  
Anaheim, CA 92803  
(714) 821-2011

Central Point Software  
P.O. Box 19730-#203  
Portland, OR 97219  
(503) 244-5782

Corvus Systems  
2029 O'Toole Ave.  
San Jose, CA 95131  
(408) 946-7700

Enter Computer  
6867 Nancy Ridge Dr.  
San Diego, CA 92121  
(619) 450-0601

Interactive Structures  
146 Montgomery Ave.  
P.O. Box 404  
Bala Cynwyd, PA 19004

Micro-Sci  
2158 South Hathaway St.  
Santa Ana, CA 92705  
(714) 662-2801

Quark Engineering  
1433 Williams  
Suite 1102  
Denver, CO 80218  
(303) 399-1096

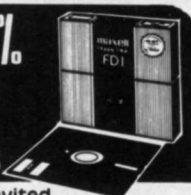
Southern California Research Group  
P.O. Box 2231  
Goleta, CA 93118

SSM  
2190 Paragon Dr.  
San Jose, CA 95131  
(408) 946-3616

Wesper Micro Systems  
(714) 850-1666;  
outside CA (800) 854-8737

The Original Apple III's  
P.O. Box 813  
San Francisco, CA 94101

**SAVE 50%  
on  
maxell  
DISKETTES**



Dealer Inquiries Invited

**5 1/4"** Specify Soft  
10 or 16 Sector prices/10  
MD1-MH1 1 side/dbl dens. .... **\$27.90**  
MD2-MH2 2 side/dbl dens. .... **\$40.00**  
MD1-DDM 1 side/quad 96 tpi. .... **\$36.50**  
MD2-DDM 2 sides/quad 96 tpi. .... **\$45.50**

**8"** Specify Soft or 32 Sector  
FD1-FH1 1 side/sgl or dbl dens. .... **\$38.90**  
FD2-FH2 2 sides/dbl den. .... **\$45.50**  
Checks-VISA-MC-C.O.D./Add \$2 Shipping  
Call or write for our discount catalog.

**LYSEN COMPUTER SYSTEMS**  
27204 Harper Ave., St. Clair Shores, MI 48081  
Phone: (313) 777-7780

**Maxell. The Gold Standard.**

CIRCLE 157 ON READER SERVICE CARD

#### EDUCATIONAL SOFTWARE TRS-80, COLOR COMPUTER, PET & APPLE II

<b>ELEMENTARY</b>	<b>MATH</b>
<b>SCIENCE</b>	<b>HISTORY</b>
<b>GEOGRAPHY</b>	<b>ACCOUNTING</b>
<b>ECONOMICS</b>	<b>BUSINESS ED.</b>
<b>FOREIGN LANG.</b>	<b>PHYSICS</b>
<b>GRAMMAR</b>	<b>FARM RECORDS</b>

Write for FREE Catalogue:

**MICRO LEARNINGWARE, Box**  
**2134, N Mankato, MN 56001**  
**(507) 625-2205**

**VISA & MASTER CARD ACCEPTED**

We pay 15% royalty for Educational Programs listed with us. TRS-80 is a registered trademark of TANDY CORP.

PET is a trademark of COMMODORE BUS. MACHINES. APPLE is a trademark of APPLE COMPUTER CO.

CIRCLE 223 ON READER SERVICE CARD

## FREE CATALOG!

Just let us know and we'll mail you a FREE *Creative Computing* Catalog—16 pages filled with books, buyer's guides, magazines, and more!

To get your FREE catalog, write to: *Creative Computing* Catalog, Dept NA1X 39 East Hanover Ave., Morris Plains, NJ 07950.

# wabash®

**When it comes to  
Flexible Disks, nobody  
does it better than  
Wabash.**

MasterCard, Visa Accepted.  
Call Free: (800) 235-4137



**PACIFIC  
EXCHANGES**  
100 Foothill Blvd  
San Luis Obispo, CA  
93401 (In Cal call  
(805) 543-1037)

CIRCLE 236 ON READER SERVICE CARD

**Now...all the  
advantages  
plus COLOR...**

## FRANKLIN ACE computer

**Add COLOR-only \$59<sup>95</sup>**

**Convert graphics to color  
w/Adwar FCB plug-in board.**

**Available now in stock  
at your local dealer — or**

## ADWAR

335 West 35th St. / New York 10001

**(212)691-0976**

**PROMPT SHIPMENT • MASTER CARD/VISA**

CIRCLE 106 ON READER SERVICE CARD

**Educational Software  
For The COMMODORE**

## VIC-20



**Wide Variety Of Subjects  
Available For All Ages**

**FOR FREE BROCHURE WRITE:**

Schoolmaster  
Programming Company  
P.O. Box 194, Pomona, CA 91769

CIRCLE 187 ON READER SERVICE CARD

# outpost: atari



The baseball season is in full swing, so to speak, and no one here is surprised about the Mets, but I wish the Yankees would get their act together. It is not so much the pennant hopes going up in smoke, as the thought of seeing Martin leave in tears yet again. It makes me sick to my stomach. I expect next season Steinbrenner will bat clean-up.

Last time around I intimated that this month's column would bear some very good news for Atari computer fans. These loyalists, I dare say, have been somewhat comparable lately to baseball fans in Muddville. That means keeping up the enthusiasm despite the nasty strikeouts.

If you have been poised on the edge of your seat, racked with concern, anxious, sweaty palmed, waiting for a homer in home computers from Atari, you won't be disappointed. Yessir, folks, there will be a new beginning, and at least some of the facts are in.

The Atari 1200 has been benched. Riddled with compatibility problems, beset by severe video signal woes, a gaggle of petty compromises, and generally reviled by the community of Atari users, production of the 1200 XL machine was suspended some time ago pending a "policy reexamination." Happily, that reexamination resulted in Atari pulling the 1200 XL off the market entirely and permanently. The last of the machines are now on the shelves.

In showing the courage to admit their sizable and costly error and to choose a new lineup, Atari has shown some class and the first signs of intelligent life we have seen in some time. Let's hope they keep it up.

In the interest of good will, I won't rehash my beefs about the 1200. It is gone; it is of the past. Let's put it behind us.

And let's take a fresh look at the future. After a rather humorous, albeit bizarre detour, Atari home computers are

## John J. Anderson

moving in the right direction once again. That is moving ahead, especially in terms of competitive pricing, while wisely leaving some proven formulas untampered with. Bravo, boys. Here is the roster, as of press time:

- *The Atari 600 XL.* Yes, you read it right. The Atari 600 lives. And it is looking very good. With 16K expandable to 64K, a full stroke keyboard, and built-in Atari Basic, the machine has a promising future. Especially because it will use the original operating system that made its predecessors famous—that means it will boot *all* existing Atari software within existing memory constraints. And I assume it will put out the same clear, clean video that the 400 and 800 machines have always delivered to any TV or monitor. Then do a double take at the price: \$199 list.

- *The Atari 800 XL.* This machine will have 64K standard, and also use the old OS, as do all the new machines from Atari. And, using its expansion port, memory can be expanded to a whopping 192K. Not too many details have been made available concerning the expansion capability, but already there is talk of an expansion chassis to hold 80-column cards and the like. And jumping jiminy, the list price is only \$299.

- *The Atari 1400 XL.* This is the replacement machine for the ill-fated 1200 with most of the grievances redressed. The compatible operating system will be there, along with hardware expansion capability, and even (hold on to your hats) a built-in modem! It must sound as if I am making this up, but it is the truth; there will even be an onboard speech synthesis chip. Jeepers. For a list price of \$499, I would have settled for a measly parallel port.

- *The Atari 1450 XLD.* Nothing more than a 1400 XL for your \$799 list, except for the built-in low-profile 5¼" disk drive. Atari Home Computer Division may have been down, but is not out of the game yet. Not by a long shot. Okay, it is quite conceivably the bottom of the ninth, with two out. But Casey is on base and the tying run is at the plate.

- *The Atari 1050 Disk Drive.* This is the stand-alone version of the drive built into the 1450 XLD. It is a half-height drive. Using the new DOS 3.0, it is capable of more than 150K of storage on a single disk. At the same time, it remains completely compatible with all existing 2.0 disk software. Pricing not available at press time.

- *The Atari 1027 Printer.* Not much more to say about this now other than that it is a letter quality printer for \$399.

Now don't you agree that news like this is good news indeed?

Oh yes, and just a little bit more to brighten your day—your third-party cartridges *will fit* in these new machines. It just might be that Atari has come around.

We will soon find out.

Our guest tutorial this month is from Fred Pinho, author of the game program "Medieval Combat," which appeared in the May 1983 issue of *Creative*. Fred is very knowledgeable about Atari memory conservation, among other Atari topics. In the balance of this installment of the Outpost, he will provide insight into a very powerful technique for compacting data and saving a great deal of annoying load time.

Before I surrender the rostrum, I must thank Alfred Publishing, and specifically Joseph Cellini, for allowing us to reproduce Appendix B from the booklet "Understanding Atari Graphics." This is the only reference I have seen that provides a keypress to ATASCII chart, which is necessary to

# At last, the first home video joystick that puts the firing button where it should have been in the first place.

The new Triga-Command is like no other home video joystick controller you've ever used.

The firing button is directly under your trigger finger, the finger with the fastest reflex action. Which means your thumb doesn't ache any more after playing long games, your firing is more accurate, and your scores are higher.

No other joystick gives you such a terrific grip either. That's because the handle is big and comfortable, not thin and spindly like the others. It's shaped to fit your hand, and has a diamond-cut textured surface to give you the "feel" of genuine Arcade-style joysticks.

Another unique feature are our removable suction cups under the base which clamp Triga-

Command firmly to any smooth playing surface for total single handed operation.

And our joystick is tough. It's made from high impact plastic, so it won't crack under pressure.

Do you use an Atari 400 or 800 computer, the Atari 2600 system, Vic-Commodore computers, or Sears Tele-Games? No problem. Triga-Command fits them all.

All thumbs with ordinary home video joysticks? Get a grip with Triga-Command. It's the first joystick to put the firing button under your trigger finger.—And isn't that where it should have been in the first place?



## Outpost: Atari, continued...

take advantage of Fred's data technique.

And so here is Fred. If you wish to correspond directly with him, his address is 676 Rollingwood Way, Valley Cottage, New York 10989.

\* \* \*

One straightforward way to load numerical data into a computer is to READ the data value and POKE it into the desired memory location. An example of this method is shown in Listing 1. Though easy to program, it is memory inefficient and runs relatively slowly. This method requires anywhere from three to five bytes for each data number stored. Why? Each number given in the program requires one to three integers plus a comma in the DATA statement. This, and the memory location used for final storage, add up to three to five bytes.

If you run the program in Listing 1, you will see how slow this procedure can be (87 seconds to load 6000 bytes). The same thing is accomplished by Listing 2 in only two seconds! I once wrote a program that required about 9400 numbers to be loaded for use in a graphics routine. This took forever to perform (about five minutes). It also consumed excessive amounts of precious memory (even 32K can be used up quickly). I was able to keep memory usage to this level only because some of the data were repeated and thus did not have to be listed in DATA statements. By contrast, the method shown in Listing 2 cut the loading time to 25 seconds and saved roughly 8K bytes of memory.

The method shown in Listing 2 depends on two techniques. First, represent the number by its graphics equivalent rather than by the actual numerals. This reduces memory use by eliminating the comma in the DATA statement and cutting the bytes used to represent the number in the DATA state-

### Listing 1. Loading time about 87 seconds.

```
1000 POKE 106,PEEK(106)-24:GRAPHICS 0:D=
PEEK(106):256
1010 FOR X=1 TO 6000 STEP 100:RESTORE
1020 FOR Y=0 TO 99:READ Z:POKE D+X+Y,Z:N
EXT Y
1030 NEXT X
1040 DATA 65,66,65,66,65,66,65,66,65,66,
65,66,65,66,65,66,65,66,65,66,65,66,
6,65,66,65,66,65,66,65,66,65,66,65,66,
1050 DATA 65,66,65,66,65,66,65,66,65,66,
65,66,65,66,65,66,65,66,65,66,65,66,65,66,
6,65,66,65,66,65,66,65,66,65,66,65,66,
1060 DATA 65,66,65,66,65,66,65,66,65,66,
65,66,65,66,65,66,65,66,65,66,65,66,65,66,
6,65,66,65,66,65,66,65,66,65,66,65,66
```

### Listing 2. Loading time about 2 seconds.

```
1000 DIM A$(6000),B$(100)
1010 GRAPHICS 0:FOR X=1 TO 6000 STEP 100
:RESTORE
1020 READ B$:A$(X,X+99)=B$
1030 NEXT X
1040 DATA ABABABABABABABABABABABABABABAB
ABABABABABABABABABABABABABABABABABABAB
ABABABABABABABABABABABABABABABABABABAB
```

## Keypress to ATASCII chart.

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
0	CTRA-	♥
1	CTRL-A	␣
2	CTRL-B	␣
3	CTRL-C	␣
4	CTRL-D	␣
5	CTRL-E	␣
6	CTRL-F	␣
7	CTRL-G	␣
8	CTRL-H	␣
9	CTRL-I	␣
10	CTRL-J	␣
11	CTRL-K	␣
12	CTRL-L	␣
13	CTRL-M	␣
14	CTRL-N	␣
15	CTRL-O	␣
16	CTRL-P	␣
17	CTRL-Q	␣
18	CTRL-R	␣
19	CTRL-S	␣
20	CTRL-T	␣
21	CTRL-U	␣
22	CTRL-V	␣
23	CTRL-W	␣
24	CTRL-X	␣
25	CTRL-Y	␣
26	CTRL-Z	␣
27	ESC/ESC	␣
28	ESC/CTRL-	␣
29	ESC/CTRL=	␣
30	ESC/CTRL+	␣
31	ESC/CTRL*	␣
32	SPACE BAR	Space
33	SHIFT-1	!
34	SHIFT-2	"
35	SHIFT-3	#
36	SHIFT-4	\$
37	SHIFT-5	%
38	SHIFT-6	&
39	SHIFT-7	'
40	SHIFT-9	(
41	SHIFT-0	)
42	*	*

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
43	+	+
44	,	,
45	-	-
46	.	.
47	/	/
48	0	0
49	1	1
50	2	2
51	3	3
52	4	4
53	5	5
54	6	6
55	7	7
56	8	8
57	9	9
58	SHIFT	:
59	:	:
60	<	<
61	=	=
62	>	>
63	SHIFT-\	?
64	SHIFT-8	@
65	A	A
66	B	B
67	C	C
68	D	D
69	E	E
70	F	F
71	G	G
72	H	H
73	I	I
74	J	J
75	K	K
76	L	L
77	M	M
78	N	N
79	O	O
80	P	P
81	Q	Q
82	R	R
83	S	S
84	T	T
85	U	U

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
86	V	V
87	W	W
88	X	X
89	Y	Y
90	Z	Z
91	SHIFT-;	
92	SHIFT,	\
93	SHIFT+.	
94	SHIFT*	^
95	SHIFT-	-
96	CTRL-	␣
97	a	a
98	b	b
99	c	c
100	d	d
101	e	e
102	f	f
103	g	g
104	h	h
105	i	i
106	j	j
107	k	k
108	l	l
109	m	m
110	n	n
111	o	o
112	p	p
113	q	q
114	r	r
115	s	s
116	t	t
117	u	u
118	v	v
119	w	w
120	x	x
121	y	y
122	z	z
123	CTRL-;	␣
124	SHIFT =	
125	ESC/CTRL< or ESC/SHIFT<	␣
126	ESC/BACK S	␣
127	ESC/TAB	␣

Keypress to ATASCII chart,  
continued.

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
128	(A) CTRL-.	•
129	(A) CTRL-A	␣
130	(A) CTRL-B	␣
131	(A) CTRL-C	␣
132	(A) CTRL-D	␣
133	(A) CTRL-E	␣
134	(A) CTRL-F	␣
135	(A) CTRL-G	␣
136	(A) CTRL-H	␣
137	(A) CTRL-I	␣
138	(A) CTRL-J	␣
139	(A) CTRL-K	␣
140	(A) CTRL-L	␣
141	(A) CTRL-M	␣
142	(A) CTRL-N	␣
143	(A) CTRL-O	␣
144	(A) CTRL-P	␣
145	(A) CTRL-Q	␣
146	(A) CTRL-R	␣
147	(A) CTRL-S	␣
148	(A) CTRL-T	␣
149	(A) CTRL-U	␣
150	(A) CTRL-V	␣
151	(A) CTRL-W	␣
152	(A) CTRL-X	␣
153	(A) CTRL-Y	␣
154	(A) CTRL-Z	␣
155	(A) RETURN (LOL) RETURN	␣
156	ESC/SHIFT-BACK S	␣
157	ESC/SHIFT->	␣
158	ESC/CTRL-TAB	␣
159	ESC/SHIFT-TAB	␣
160	(A) SPACE BAR	␣
161	(A) SHIFT-1	!
162	(A) SHIFT-2	"
163	(A) SHIFT-3	#
164	(A) SHIFT-4	\$
165	(A) SHIFT-5	%
166	(A) SHIFT-6	&
167	(A) SHIFT-7	'
168	(A) SHIFT-9	(
169	(A) SHIFT-0	)

Table 1.

Byte

Contents

- 1 Contains the number 129 which specifies that the variable is a string.
- 2 Variable Number (0 to 127). These numbers are assigned in sequence as the variables are declared in the program.
- 3,4 These bytes give the offset from the beginning of the string/array table to the first memory location of the string variable. The bytes are stored with the least significant byte first (as are the following pairs). Thus to obtain the offset, multiply the contents of location 4 by 256 and add the contents of location 3.
- 5,6 Contains the number of the last string location that has had data actually written to it.
- 7,8 Contains the maximum length of the string as given in your DIM statements.

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
170	(A) *	*
171	(A) +	+
172	(A) ,	,
173	(A) -	-
174	(A) .	.
175	(A) /	/
176	(A) 0	0
177	(A) 1	1
178	(A) 2	2
179	(A) 3	3
180	(A) 4	4
181	(A) 5	5
182	(A) 6	6
183	(A) 7	7
184	(A) 8	8
185	(A) 9	9
186	(A) SHIFT-:	:
187	(A) ;	;
188	(A) <	<
189	(A) =	=
190	(A) >	>
191	(A) SHIFT-/	?
192	(A) SHIFT-8	@
193	(A) A	A
194	(A) B	B
195	(A) C	C
196	(A) D	D
197	(A) E	E
198	(A) F	F

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
199	(A) G	G
200	(A) H	H
201	(A) I	I
202	(A) J	J
203	(A) K	K
204	(A) L	L
205	(A) M	M
206	(A) N	N
207	(A) O	O
208	(A) P	P
209	(A) Q	Q
210	(A) R	R
211	(A) S	S
212	(A) T	T
213	(A) U	U
214	(A) V	V
215	(A) W	W
216	(A) X	X
217	(A) Y	Y
218	(A) Z	Z
219	(A) SHIFT-,	
220	(A) SHIFT-+	\
221	(A) SHIFT-.	
222	(A) SHIFT-*	^
223	(A) SHIFT-	-
224	(A) CTRL-.	•
225	(A) a	a
226	(A) b	b
227	(A) c	c

Decimal Code	Keystrokes to Produce Character	Mode 0 ATASCII Character
228	(A) d	d
229	(A) e	e
230	(A) f	f
231	(A) g	g
232	(A) h	h
233	(A) i	i
234	(A) j	j
235	(A) k	k
236	(A) l	l
237	(A) m	m
238	(A) n	n
239	(A) o	o
240	(A) p	p
241	(A) q	q
242	(A) r	r
243	(A) s	s
244	(A) t	t
245	(A) u	u
246	(A) v	v
247	(A) w	w
248	(A) x	x
249	(A) y	y
250	(A) z	z
251	(A) CTRL-;	␣
252	(A) SHIFT-=	
253	ESC/CTRL-2	␣
254	(A) ESC CTRL-BACK S	␣
255	(A) ESC/CTRL->	␣

# How to use computers to teach math!

## COMPUTERS IN MATHEMATICS:

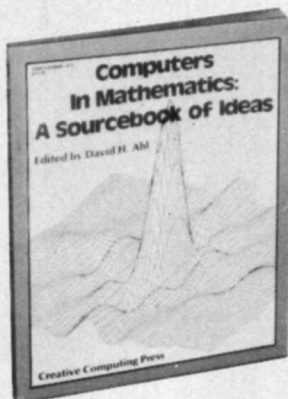
### A SOURCE BOOK OF IDEAS

Now that more and more math departments have access to a micro-computer, the problem becomes: How to use the computer effectively as a teaching aid?

Here's where **COMPUTERS IN MATHEMATICS** can help you. This book of reprints from *Creative Computing* magazine is a goldmine of learning ideas, problem-solving strategies, programming hints, puzzles, brain teasers, and much more!

**COMPUTERS IN MATHEMATICS** covers nine subject areas:

- Computer literacy and computers in society.
- Thinking strategies and how to solve problems.
- Computer simulations and how to write them.
- Probability.
- Mathematical miscellany, from circular functions to differential equations.
- Art and graphics and their relation to mathematics.
- Computer Assisted Instruction (CAI).
- Programming style.
- Puzzles, problems and programming ideas.



8 1/4" x 11", softcover,  
hundreds of black-and-white  
diagrams and illustrations.

In all, **COMPUTERS IN MATHEMATICS** contains 77 fascinating articles, over 200 problems for assignment, and nearly 100 programs. Edited and with a preface by David H. Ahl, Editor-in-Chief of *Creative Computing*, this immensely practical volume is an invaluable classroom tool for teachers and students of all grades.

#### USE THE COUPON TO ORDER YOUR COPY TODAY!

**CREATIVE COMPUTING PRESS** Dept. HA2B, 39 East Hanover Avenue  
Morris Plains, New Jersey 07950

Please send me \_\_\_\_\_ copies of **COMPUTERS IN MATHEMATICS:**  
A Sourcebook of Ideas, at \$15.95, plus \$2.00 postage & handling,\* each. #12D

**CHECK ONE:** ☐ Payment enclosed \$\_\_\_\_\_ (CA, NJ and NY STATE  
residents add applicable sales tax.)

☐ Charge my: ☐ American Express ☐ MasterCard ☐ Visa

Card No. \_\_\_\_\_ Expire Date \_\_\_\_\_

Signature \_\_\_\_\_

Mr./Mrs./Ms. \_\_\_\_\_  
(please print full name)

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

\*Outside USA add \$3.00 per order.

For faster service, call **TOLL FREE 800-631-8112**. (In NJ call 201-540-0445.)

#### Outpost: Atari, continued...

ment to one. It also allows you to pack more data into each program line. This saves additional memory by eliminating additional line numbers and DATA statements.

Entering the graphics symbols is more time-consuming than typing the number. However, it is not too difficult if you use the tables shown here. In these tables, each key stroke required to generate the appropriate symbol is detailed. Be careful to observe the following notes otherwise you will find errors in your data.

There is one limitation to this method; you can't use it directly for the values of 34 and 155. These ATASCII values are the codes for quotation marks and for the RETURN function. You can't type these directly into a string because the Atari will treat them as string and line terminators. The easiest way to get around this problem is to load a space from a DATA statement into the desired string location. Once the string has been accepted by Basic, the string can be modified via the CHR\$ function to add the desired value. As long as you don't PRINT the modified string, all is well. For example:

```
1000 DIM A$(10)
1010 READ A$
1020 A$(6,6)=CHR$(34)
1030 DATA AXY*+ CD/P
```

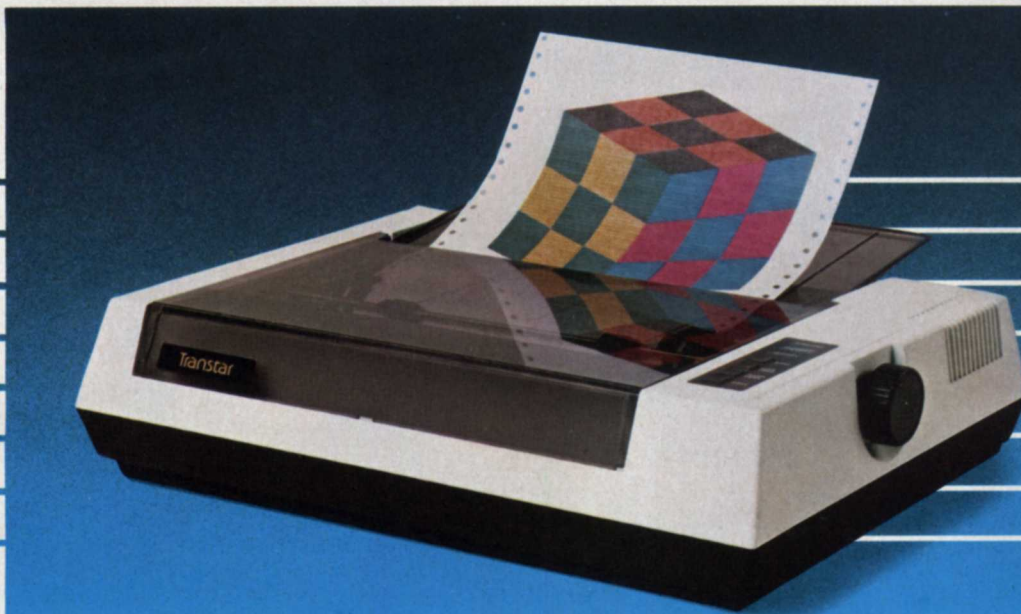
The second technique, which speeds up program execution, is simply the reading of a whole string of characters at once rather than byte by byte using READ and POKE commands.

After you have loaded your data as strings, there are many things you can do that are not immediately obvious. Strings are a very economical form of data storage. Consider that each value in an array or matrix consumes six bytes of memory while string storage takes one byte. If you are working with large amounts of data, the savings can be considerable. For example, a 20x20 matrix would normally require 2646 bytes for data storage. Remember that Atari Basic always assigns a zero element to an array or matrix so that 20x20 is really 21x21. The same amount of data could be stored in a string in 441 bytes. Of course, the saving in memory is not quite that good since the string technique requires more complex code than direct use of matrices. You will come out way ahead, however.

As it stands, this technique can only handle data in the range of 0-255. This is not a severe limitation since these values are the ones required for graphics work. With a little further programming effort, two byte string values can be stored. These would provide a data-value range of zero to 65,535.

# Innovative technology brings you quality color printing

## for only \$599



**T**he technology of the all-new Transtar 315 color printer revolutionizes color impact printing! Unlike old-fashioned printers needing multiple passes with pins to print color, the Transtar 315 employs an innovative 4-hammer print head to allow 7 colors and more than 30 shades to be printed in a single pass!

A unique 4-color diagonal ribbon maximizes the efficiency of the 315's color imaging and enhances its simple reliability. Built by Seikosha, the most experienced manufacturing company of the famous Seiko group, the Transtar 315 is **available now** and has been designed to be compatible with the IBM, Apple II/IIe and Franklin personal computers. An optional PICS card also allows Apple and Franklin users to simply depress the 315's "copy" button to print any high- or low-resolution screen without exiting a program!

Transtar is bringing the technology of tomorrow to you today. Your future in color printing is only \$599 away.

## Transtar

P.O. Box C-96975, Bellevue, Washington 98009

CIRCLE 220 ON READER SERVICE CARD

# Look over the Rainbow.

Learn Rainbow™ computer-based instruction ends manual labor. No slaving over computer manuals, you learn to use the Rainbow on screen, in minutes, not months.

The Rainbow shows more character, 132 columns instead of the usual 80. So you can screen a 12 month spreadsheet, without losing 6 months.

One of the Rainbow's best features is the service and support from Digital, the world's second largest computer company.

Keyboard is designed with separate function groups and special keys like "HELP", "DO", and "NEXT SCREEN".

The Rainbow's sleek, comfortable keyboard with standard typewriter keypad fits almost anywhere, even on your lap.

Of the hundreds of software applications now available many are Digital Classified and serviced.

Only the Rainbow automatically runs the widest range of the popular 8-bit and 16-bit CP/M® software.

After you look over the Rainbow™ personal computer on paper, look over the Rainbow in person. To learn where, call 1-800-DIGITAL or write **Digital Equipment Corporation**, 200 Baker Avenue, Concord, MA 01742.

Not even the world's largest computer company gives you so much. But the second largest does.

**digital**

© Digital Equipment Corporation 1983  
CP/M is a registered trademark of Digital Research, Inc.

## Outpost: Atari, continued...

How does one access a string as if it were a matrix? It isn't too difficult. Assume an R by C matrix (R=rows; C=columns). Remember that we actually have R+1 rows and C+1 columns due to the zero elements of the matrix. What string position corresponds to the matrix element (X,Y)?

String Position =  $X*(C+1)+Y+1$   
Note that the above is for single-byte numbers. A similar analysis can be developed for double-byte numbers. The data value stored in the string can then be recovered via the ASC function. As an example, for a 2 x 2 matrix where the (1,2) element is desired:

```
1000 DIM MATRX$(9)
1010 MATRX$="5A6D*+7Z$":C=2
1020 X=1:Y=2:S=X*(C+1)+Y+1
1030 MATRX=ASC(MATRX$(S,S))
```

A very powerful technique, using "data strings," involves forcing the computer to place the desired string data into a location specified by the programmer rather than by the computer. This is not an easy task, but it can be done. To accomplish it requires a knowledge of how the Basic system keeps track of strings. Basic sets aside two tables (among others) in memory called the Variable Value Table (VVT) and the String/Array Table (SAT). The location of the VVT is stored in memory locations 134 and 135 and is found by the following:  $256*PEEK(135) + PEEK(134)$ . Eight bytes are reserved for each variable declared in the program (variables include scalar, array and string variables). For a string variable, the bytes are assigned as shown in Table 1.

The String/Array Table is an area in memory reserved by the computer to accommodate string and array data. The size of this table is determined by the programmer through his dimension statements. This table normally resides in memory above the Basic program.

With the above information in mind, we can proceed to bend the computer to

## Program Details.

### 1. Listing 1.

Lines  
1000

Lower RAMTOP and issue Graphics call to have the Atari relocate the display list and data below the new RAMTOP.

1010-1030

READ each data value and POKE into a specified location above RAMTOP.

1040-1060

Numerical data.

### 2. Listing 2.

Lines  
1000

Dimension the final data string (A\$) and a smaller holding string (B\$).

1010

Sets up loop to RESTORE the DATA line 60 times so that it can be reread.

1020

Reads DATA line in B\$ and inserts B\$ into A\$.

1030

End of loop.

1040

DATA line containing data in form of graphics characters.

### 3. Listing 3.

Lines  
10-20

Dimension of data strings.

30

Graphics call. Calculation of address of Variable Value Table (VVT) and String/Array Table (SAT).

40

Calculation of location of pointer to screen display memory (ST) and of address of screen display memory (DDA).

50-60

Calculation of Offset (OFS) from the start of the String/Array Table to a given line in the screen display memory (GR.4 uses 10 bytes per line). V3 and V2 are the high and low bytes of this offset. POKE the offset (V2 and V3) and the current and dimensioned length (10 for both) of each screen display string (AA\$ to FF\$) into the Variable Value Table. Note that to simplify the coding, these strings were dimensioned first, and no variables were declared until this was done. This makes sure that the first six entries in the Variable Value Table will be the desired strings.

70

Dimension temporary holding strings. Used to load data strings.

80

Bypass subroutine.

90

Subroutine to read data and insert into HG\$.

100-150

Insert HG\$ into appropriate data string.

160

String handling routine. By rotating different data into the screen strings, desired graphics can be scrolled across the screen.

170

Timing loop to slow movement.

180

Read data and load into strings.

190-200

Scroll data from right to left across screen.

210

Reverse motion.

220

END.

230-280

DATA statements.



## Outpost: Atari, continued...

our way of thinking. Listing 3 gives a simple program that stores data in six strings and then locates another set of strings in the screen display data area. Then, by use of the Basic string manipulation commands, data are scrolled horizontally across the screen. The data movement is jerky by machine language standards but still impressive and useful when compared to the other techniques available in Basic.

Of course, you can go to the "player-missile" system to get easily pro-

grammed horizontal scrolling. But note that the player width is only one byte. Even if you link the four players together, the maximum width is only four bytes. With the string techniques, however, the horizontal "width" of your graphics data is limited only by the memory capacity of the Atari.

This string-modification technique can also be used to provide rapid vertical motion for a "player" in the player-missile graphics system. To move a player vertically, the player data must be

continuously relocated within the player memory area. Using PEEK and POKE is excruciatingly slow. The use of strings, however, provides the capability of rapid movement. See George Blank's "Outpost: Atari" in the April 1981 issue of *Creative* (pp. 194-196) for a full explanation of this technique.

If you try to print your graphically loaded strings to the screen to check the results, you will get an unpleasant surprise. Your graphics symbols will probably include some editing characters. These will perform their function when printed to the screen, causing your string to perform strange gyrations. The result will be an incorrectly printed string. The best solution to this problem that I have found is to convert the graphics symbols back into ATASCII data and print them. An example for a 360 character string is given below.

### Listing 3.

```
10 DIM A$(1),B$(1),C$(1),D$(1),E$(1),F$(1)
20 DIM A$(100),B$(100),C$(100),D$(100),E$(100),F$(100)
30 GRAPHICS 4:UT=PEEK(134)+256*PEEK(135)
40 ST=PEEK(140)+256*PEEK(141)
50 SAT=PEEK(560)+256*PEEK(561)+4*DDA=PEEK(562)+256*PEEK(563)
60 FOR T=0 TO 5:OFS=DDA+90*(T*10)-SAT:U3=INT(OFS/256):U2=OFS-256*U3
70 POKE U1+(8*T)+2,U2:POKE U1+(8*T)+3,U3:POKE U1+(8*T)+4,U3:POKE U1+(8*T)+5,U3:POKE U1+(8*T)+6,U3
80 DIM SM$(10),HG$(100)
90 GOTO 180
100 READ SM$:HG$(LH,LH+4)=SM$:LH=LH+5:RETURN
110 A$=HG$:RETURN
120 B$=HG$:RETURN
130 C$=HG$:RETURN
140 D$=HG$:RETURN
150 E$=HG$:RETURN
160 F$=HG$:RETURN
170 A$=A$(I,I+9):B$=B$(I,I+9):C$=C$(I,I+9):D$=D$(I,I+9):E$=E$(I,I+9):F$=F$(I,I+9):RETURN
```

```
170 FOR T=1 TO 30:NEXT T:RETURN
180 FOR X=0 TO 5:LH=1:FOR Y=1 TO 20:RESTORE 230+(X*10):GOSUB 90:NEXT Y:GOSUB 100+(X*10):NEXT X
190 I=1:GOSUB 160:GOSUB 170:FOR I=2 TO 9:GOSUB 160:GOSUB 170:SETCOLOR 0,INT(RND(0)*14)+1,INT(RND(0)*9)+4:NEXT I
200 FOR X=1 TO 10:GOSUB 170:NEXT X
210 FOR I=91 TO 1 STEP -1:GOSUB 160:GOSUB 170:SETCOLOR 0,INT(RND(0)*14)+1,INT(RND(0)*9)+4:NEXT I
220 ? "":END
225 REM TYPE DATA AS GIVEN IN REM STATEMENTS AFTER EACH LINE. DO NOT TYPE COMMAS BETWEEN SYMBOLS.
230 DATA >:REM CNTRL COMMA,CNTRL X,>:CNTRL X,CNTRL COMMA
240 DATA !$T$:REM SHIFT =,SHIFT 4,T,SHIFT 4,CNTRL COMMA
250 DATA UZ~B:REM INVERSE U,Z,ESCAPE CNTRL BACK S,B,CNTRL COMMA
260 DATA UZ~:REM INVERSE U,Z,ESCAPE CNTRL BACK S,ESCAPE CNTRL >,CNTRL COMMA
270 DATA !$T$:REM SHIFT =,SHIFT 4,T,INVERSE CNTRL Y,CNTRL COMMA
280 DATA >:REM CNTRL COMMA,CNTRL X,>:ESCAPE CNTRL >,CNTRL COMMA
```

```
1000 OPEN #3:80,"P:"
1010 FOR X=1 TO 360
1020 ST=ASC(Z$(X,X))
1030 ? #3:ST,"";
1040 NEXT X
1050 CLOSE #3
```

This will print out your original numerical data for checking. If you wish to print to the screen rather than to the printer, simply replace P: in line 100 with S:.

# COMSTAR

INTRODUCING SOMETHING NEW AND USEFUL  
THE ALOG PAGEWRITER  
FOR ATARI 800/400

A Fast, Simple, Easy To Use and Inexpensive  
WORD PROCESSOR

- Average Time To Master — 5 min
- Full Page Display Guide
- Help Screen With Command Summary
- Uses Standard ATARI Editing Keys
- Visible Adjustable Margins
- Stores Ten Pages on a Disc with No Swapping

### Other Features Include:

Centering of Text • Set Tabs • Right Justification • Easy Text Insertion • Accepts Printer Control Commands

Requires at least 32k of memory and a 80 column printer.

List price, 39.95. Introductory price **\$34.00**.  
Manual included.

DEALER INQUIRIES INVITED

**COMSTAR**

P.O. BOX 1730  
GOLETA, CA 93116  
(805) 964-4660

ORDERS ONLY: CALL TOLL FREE 800-558-8803

IN CALIF. (805) 964-4660 or send check, money order or credit card number and exp. date. Include \$2.00 for shipping. Add 3% for Visa or MC (except Calif.). Calif. add 6% tax. There is a \$2.50 charge for COD. Please include type of computer. (Checks—10 days to clear.)

AIR\* SHIPPING WITHIN 2 DAYS

**ATARI**

**VIC-20**

48K RAM (FOR 400)	\$115	CARDBOARD (3 SLOT EXP.)	\$ 33
64K RAM (FOR 400)	135	VIDEOPAK WITH 16K (40/80 COL)	250
ALIEN GROUP VOICE BOX (D.T)	119	VIDEOPAK WITH 64K (40/80 COL)	319
S.A.M. (D) 8K	46	PRINTER INTERFACE (PARALLEL)	55
BIT 3 80 COL. BOARD	289	KIDS AND THE VIC (BOOK)	17
TECHNICAL NOTES	25	16K RAM	85
BOX OF DISKS (10)	19	8K RAM	55
PROWRITER PRINTER	419	HES MON (ASSEMBLER) (C)	29
8 KEY 400 (KEYBOARD)	99	HES WRITER (WORD PROC.) (C)	29
NEWPORT PROSTICK	27	TURTLE GRAPHICS (C)	29
MICROBITS MODEM	159	VIC FORTH (C)	49
PRINTER INTERFACE	89	QUICK BROWN FOX (WORD PROC.) (C)	54
THE ATARI ASSEMBLER (BOOK)	12	SHAMUS (C)	29
VAL FORTH (D) 24K	45	PROTECTOR (C)	33
PREPPIE (D.T) 16K	19	CHOPLIFTER (C)	34
EASTERN FRONT (D.T) 16K	24	APPLE PANIC (C)	34
MINER 2049ER (C)	35	VIC RABBIT (C)	35
STARBOWL FOOTBALL (D.T) 24K	25	UNWORD PROCESSOR (T) 5K	19
PILOT (C)	59	STARFIGHTER JOYSTICK	14
BASIC A + WITH OS/A + (D)32K	60	CARDETTE (CASS. INTERFACE)	33
ASTRO CHASE (D) 32K	24	CRUSH, CRUMBLE & CHOMP (T)21K	24
BAJA BUGGIES (D.T) 16K	23	SWORD OF FARGOAL (T)21K	23
JUMP MAN (D) 32K	29	VICAT (T) 8K	20
CHOPLIFTER (C)	32	DEADLY DUCK (C)	28
ZAXXON (D.T)	29	TOTL MAIL LIST (T) 13K	19

HEAR ATARI SOUNDS THROUGH YOUR STEREO SPEAKERS WITH  
STEREODAPTER — FOR ATARI 800

- NO ASSEMBLY REQUIRED • CAN USE STEREO HEADPHONES
- SHIELDED CABLE • ADJUST TONE & VOLUME WITH STEREO CONTROLS

STEREODAPTER WITH 16 FT CABLE \$8 WITH 26 FT CABLE \$10

DEALER INQUIRIES INVITED

C - CARTRIDGE D - DISK T - CASSETTE \* MOST ITEMS

# rt...commodore's port...cc



Before we get started with the column this time around, I would like to put out an all points bulletin to Commodore computer owners everywhere, in the form of a call for manuscripts.

Here at *Creative Computing* we are currently amassing material for at least two books about Commodore computers. *The Creative Vic-20* and *The Creative Commodore 64* will continue in the tradition of *Creative* microcomputer books, providing a compendium of articles about the two hottest Commodore machines around.

If you have a contribution to make to either of these two books, we would be most happy to evaluate it for inclusion in either or both books. Because we like to include new material in the anthologies, your application, program or review may be just what we are looking for. So get it done. Make sure that it is typed, printed out, or otherwise legible, and *double-spaced*. Attach program listings, photos, and/or diagrams. Then get it in the mail to us.

As ever, we are *Creative Computing*, 39 East Hanover Ave., Morris Plains, NJ 07950. If you want your manuscript to be returned, enclose a self-addressed, stamped envelope, correctly sized.

Who knows? Perhaps your own work will be immortalized by *Creative Computing Press*. So get cracking!

In this month's column, we'll take a look at a very controversial topic concerning the Commodore 64, then evaluate a new mass storage device for the Vic-20 and 64 machines.

## The Great Commodore 64 Video Controversy

When the Commodore 64 first arrived on the microcomputer marketplace, it

## John J. Anderson

caused quite a stir. It was the first home computer with 64K standard; at an announced list price of \$595, it was a real bargain.

In the business of microcomputing, six months is a generation, especially in price strategies. Now all you need to do is leaf through the mail order ads in any microcomputer magazine to find the 64 selling for \$350 and less, postpaid. I confidently predict that the machine will break the \$299 barrier very soon. It won't be long before a Commodore 64 system with disk drive and printer can be purchased for less than \$1000.

At those prices, the Commodore 64 is very hard to beat. It offers sprite graphics, built-in Basic, and very sophisticated three-voice sound capability. Logo and CP/M have been slated for upcoming release. Add to this, announced piano keyboard peripherals and advanced gaming capabilities, and you have the perfect home computer, right?

## Seeking Resolution

Well, maybe. The reputation of the 64 has been clouded by reservations about the quality of its video. We have received inquiries from all over this country and beyond, asking us to comment on the video quality of the 64. Some people tell us that the pictures they have seen on screens at their local computer stores are singularly unimpressive. Others ask us whether early models carry insufficient RF shielding, causing interference.

Most often consumers poised to purchase a low end microcomputer ask whether a problem with video should af-

fect their decision to choose the 64. My answer is no.

Scout's honor and for the record, though it may not be the best in its class, the Commodore 64 is capable of producing a very acceptable color video signal.

Before a user passes judgment on the reception of a unit in a department store, computer store, or even his own home, he should understand some of the obstacles to good video, and the requisite steps to overcoming such problems. Commodore 64 video is definitely one of the more persnickety signals you may encounter, and without a doubt it demands kid glove treatment. You must realize that it will not look the way it did on an NEC monitor in the store when you hook it to the 20-year-old Philco in your den, though I admit that the salesperson seldom underscores this before a sale.

It has been my experience, however, that a video signal is rarely well tuned in a retail store. Think of how lousy the pictures look on the ordinary TVs in a department store, then think of the additional skill required to set up a computer. You can usually do better at home. Of course, there are limits to how well you can do with an ordinary TV, especially with a 64. Actually, the most dramatic way to improve the output of a Commodore 64 is with a video monitor.

When you hook a computer to your home TV set, you route the signal through a special modulator. Then the video and audio signals are sent through the antenna input and tuner of the set, just as if it were this week's segment of *60 Minutes*. Although this is certainly a convenient means of accessing a pre-existing CRT, it has severe limitations. The signal degenerates in passing

## Commodore, continued...

through the tuner section of the set—if only the video and audio signals could bypass all of that, and go directly into the circuitry designed to get the picture on the screen and the sound into the speaker.

That is exactly what many inexpensive raster monitors are designed to do. The two we have at Creative are the Amdek Color I and the TI Color Monitor. Both have built-in amplifiers and speakers to handle audio, and either can be purchased for under \$400. The difference between the video quality of the 64 on a regular TV and one of these monitors is very striking—the monitor video looks twice as sharp and can take much greater color saturation without “bleeding”—the extremely unfortunate smearing of borders between clashing colors, which is the foremost complaint I have heard from owners of the Commodore 64.

Apparently Commodore has taken the complaints to heart, because they are introducing their own inexpensive raster monitor.

If you have been thinking about getting a monitor, you should be aware of another potential boon: No longer need the other members of the family equate your time on the computer with their loss of regular TV. I might mention that this made quite a difference in my own life with wife and micro.

Whether or not you have a monitor, there are further steps you can take to maximize the signal of the 64. One of the first points I noticed about tuning in its video is that the monitor must be set quite differently from the levels I had thought of as “default” (based on the time that I have logged with Apples and Ataris). In fact, on the Amdek, my monitor of choice, there are detents for default settings which always seemed about right for those machines. Not so with the 64.

The most important change is to back off on the color level. This will immediately improve reception in almost every case: The Commodore chroma level is designed for less saturation than other machines, and less than broadcast TV too. Next, *increase* the brightness and *decrease* the contrast of the picture. This, combined with lessened color intensity, will improve video quality substantially.

Although colors on the 64 will be less vibrant at these settings, they still can be very bright. If they look washed out, go ahead and boost color saturation. Look for an overall balance between less than usual color and contrast, and greater than usual brightness to reach maximum video quality.

## A Look At Raster Technology

And yet, even these steps are not enough to thwart all cases of color bleeding, or some of the other peculiar problems of Commodore video (we've seen them on the Vic-20, too). To understand more about these problems, we must take a closer look at raster technology in general.

In the design of any machine there are trade-offs. In the design of color computers, high-end designers may commit to RGB technology, using special, expensive monitors to create impressive resolution and clarity. On some of these systems nearly photographic results can be achieved, and color bleeding occurs only when desired, by making color borders ragged or pointillistically blended. Modulation to a conventional color TV is automatically ruled out on these systems.

In succumbing to the restrictions of raster technology so that a signal can be pumped to raster monitor or conventional television, the limitations of that technology are passed to the computer designer. The resolution of such systems is very limited, and some kinds of color bleeding can be prevented only by avoiding the color combinations that cause them. These limitations are defined by the system, and nothing inside the computer will get around them.

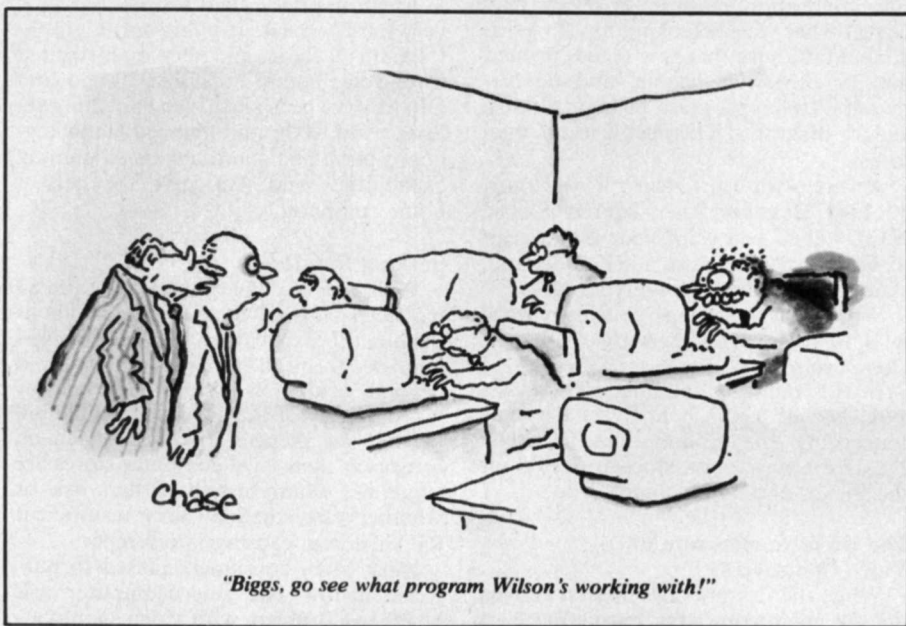
Let's compare. On the Apple II computer, character sets are always white on a black background, no questions asked. On the Atari, backgrounds can be any of 256 colors, but text must always be white or black, and in many cases, a lack of contrast or severe color bleeding makes certain color combinations un-

acceptable. On the Commodore 64, there is much greater flexibility. Character sets in any of 16 colors can appear on a background of any of the same 16 colors. The color of multiple characters can be controlled individually in a very straightforward manner with direct keyboard commands (pressing **CONTROL-WHITE** turns the cursor and all subsequent characters white). Combined with the keyboard graphics characters, this flexibility offers a powerful graphics tool.

It also creates problems. Many color combinations render the characters completely indistinguishable. Then there are the default color settings, which are mediocre at best. Though there is no bleeding, the light blue characters on a dark blue field with a light blue border are real eye-strainers. No wonder people complain about video on the 64 with such a case of the blues. At the least, the temptation is to turn the cursor white on the default background. Alas, that causes color bleeding.

Before I could get serious about programming with the 64, I had to solve this problem. The result is presented here as Program 1. It very simply makes all background and border combinations as easily accessible as character set colors and automatically picks the best available character set color to complement a chosen background. The choices always represent a color combination causing the least possible color bleeding.

As you can see from the color photographs reproduced here, many character set/background combinations are far superior to the default set, and I think you





*A sampling of complementary color combinations for the 64.*

will agree that the video quality is very acceptable.

The only backgrounds I couldn't do much with were 3 and 4, cyan and purple. Those backgrounds create smearing problems with all other colors. My advice is to avoid them except for border colors and character graphics applications (on a black background).

All 14 other colors have complements that work out very nicely. Most of the time they are light and dark versions of the same color: light green on a dark green background or dark green on a light green background. In some cases another combination works out, such as yellow, color 7, which looks good with brown text on it.

The reverse of default, using dark blue letters on a lighter blue background, is greatly superior to the default, I think. But my favorite is number 12, medium gray—very restful on the eyes while maintaining good contrast. After choosing it as a background, you can turn the cursor shade white, light gray or black, with absolutely no smearing. This could be very handy for applications that call for highlighted text.

After any set of choices, the values to be POKED for that color combination are enacted, then listed at the top of screen. As the character set color changes *after* these lines are printed, you will see some great examples of severe smearing in the POKE read-out lines. To bring them in clearly, you may have to select the same color combination a second time. Then they will be displayed in a suitable color combination. You may note the figures

to include wherever that color combination is desired in other programs.

### The Program

The program is short and self-explanatory. It displays the locations and values needed to create each color combination. I encourage you to use it as a starting point. Other complementary color combinations I did not include are surely available—you are by no means locked into the automatic choices here. But they do provide a basis on which to build.

There is another strange idiosyncrasy of 64 video, which seems, unfortunately, impossible to remedy. Even on a monitor, we see light, parallel vertical lines on all backgrounds except black, gray, and white. The only thing we can do is lessen contrast to minimize them. Though they are by no means severe, they are the kind of thing that just does not happen on an Apple or Atari. I do not know whence they emanate, but my guess is that they are *not* RFI related.



*The Exatron Stringy Floppy.*

Well, I hope I have made the issues at stake and the image of the 64 a bit clearer for you. Of course the only way to really get the picture is to resolve it for yourself.

### The Wafertape Alternative

If you own a Vic-20 or Commodore 64, you know that up until now your media for mass storage have been limited to two parochial choices. You could make an investment in the speed, convenience, and reliability of a disk drive. The only problem with this approach is cost, which in some cases exceeds that of the computer itself.

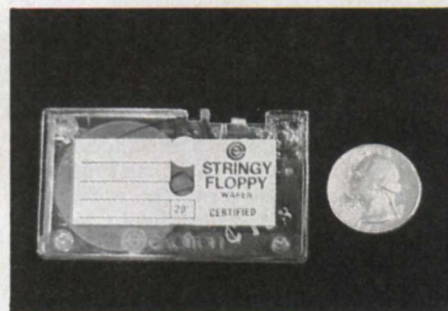
But if you chose not to part with \$400 for a drive, you were stuck with the very dreary prospect of cassette storage, using the inexpensive Datasette recorder. The snag: Although audio cassettes are great for storing the superlative audio of Kate Bush, they are not so good at storing digital data. They are necessarily slow and unreliable and do not offer the possibility of random access.

But now there is another form of storage for data from your Vic or 64. It is the wafertape or stringy floppy.

A wafertape? What's a wafertape? Well, a wafertape is something like a cassette, only quite a bit smaller, actually about the size of a credit card and not much thicker. It is wound in a continuous loop and can be of various lengths (20 feet is standard). The tape is driven at about eight inches per second, and a 20 footer can hold about 16K of data. The splice connecting the tape into a loop is silver and can be detected optically by the drive. By counting out footage from the splice, the stringy floppy can approximate random access, though it may take substantially longer than random disk access.

Stringy floppy? Well, yes, the term "stringy floppy" is probably a misnomer because the medium is neither stringy nor floppy. The intent is to evoke the image of a tape medium capable of many of the same features as a disk.

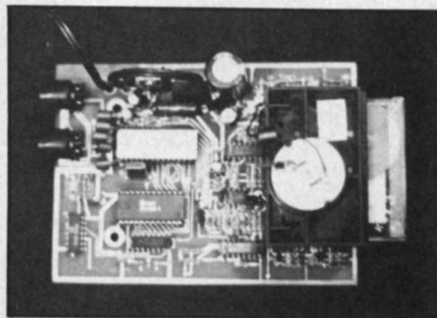
Though the wafer is smaller than cassette, it is a much more reliable computer storage medium. The tape speed of



*The wafertape is compact and continuous.*

## Commodore, continued...

8 ips (as opposed to 1½ ips for audio cassette) speeds data transfer and greatly increases the reliability of that transfer. Tape drop out and transport problems



A look inside the unit.

are minimized. In addition, wafers can be write protected in a manner akin to floppy disks.

The hardware unit is extremely compact and relatively free of mechanical parts in its transport mechanism (see photos). Your Vic-20 or Commodore 64 addresses stringy unit 0 as device 20. A second drive will be device 21. They attach in the same manner and via the same DIN pinout as a disk drive. The Datasette drive can remain attached and operational along with a wafertape device, which can also be daisy-chained via DIN to other devices, including disk drives and printers.

At about \$200, the Exatron Stringy Floppy delivers performance placed about half way between a cassette and a disk drive. As a potential buyer you must ask the question whether waiting for savings to increase and disk drive prices to fall is preferable to committing to a wafertape system.

There are many factors to consider. Wafertapes are relatively expensive (about \$3.00 each—not much less than a disk), and are available from only a single source: Exatron. Don't look for preprogrammed wafers, at least for the foreseeable future.

Couple these factors with the recommendation in the rather lackluster documentation accompanying the unit that you should store only one program per wafer until you gain "further experience" with it, and you will realize quickly that wafers are a more expensive storage medium than disk.

Why only one program per wafer? That is a question I asked, too. The documentation equivocates. As I discern it, the answer points out the main disadvantage of the wafertape drive. To store multiple files on a single wafer, you must advance to a clear area of the tape by loading through existing files, and then use a special save command. The unit will return an error condition if a

single save file is longer than wafer capacity, but it will write quite blithely over existing files with no checks whatsoever. It is up to you to estimate how many files of what sizes may share a single wafer.

Although its performance was good, it seems to me that the ESF 20/64 is an unfinished product in many ways. The potential is there for a new and reliable storage medium, but that potential is not fully reached. The unit is just too dumb, falling in the lamentable category of products that call upon the user's brain memory as buffer to take care of tedious details. Written files can be verified, but it is just too easy to blow an existing file while writing a new one. The stringy floppy I tested was not only exceedingly dumb, but didn't even have an on/off switch. This means that you have to get on all fours to plug and unplug the unit to use it. That is really annoying.

Whether or not the wafertape has any real future in the microcomputer industry is for Exatron to decide. If it takes the time to finish its product, that certainly will be a start.

I think that despite its problems, the

wafer does have some real advantages as a medium. It is smaller, more powerful, and more reliable than conventional cassettes. It could be made portable because its low-voltage motor could be battery powered. And for single file storage, it is relatively easy to use. Apparently, Coleco agrees, because it will market a read-only stringy unit for single file preprogrammed Colecovision games. Compared to ROM storage, the wafertape is a very viable alternative.

But the price must drop substantially if the ESF 20/64 stringy floppy is to survive. At the price of the Datasette, the stringy floppy begins to look like a much more attractive product. At \$200, however, it is simply too much for too little. The thought of two wafertape drives on a system at the same cost as a single disk drive is laughable (although the Commodore disk drive has its problems). It is simply not an option any educated consumer would consider for long.

The ESF 20/64 is covered by a very attractive warranty however, and should provide reliable, though limited service.

Next month: graphics and sound on the Commodore 64. □

### Program 1.

```
10 REM SETCOLOR SUBROUTINE
20 REM BY JOHN J. ANDERSON
30 REM FOR THE COMMODORE-64
40 PRINT "C"
50 GOSUB 200
60 GOTO 50
200 PRINT:PRINT "SET BACKGROUND, BORDER C
OLOR:" :PRINT
230 PRINT "(0) BLACK
240 PRINT "(1) WHITE
250 PRINT "(2) RED
260 PRINT "(3) LIGHT BLUE (SMEARING)
270 PRINT "(4) PURPLE (SMEARING)
280 PRINT "(5) DARK GREEN
290 PRINT "(6) DARK BLUE
300 PRINT "(7) YELLOW
310 PRINT "(8) LIGHT ORANGE
320 PRINT "(9) BROWN
330 PRINT "(10) DARK ORANGE
340 PRINT "(11) DARK GRAY
350 PRINT "(12) MEDIUM GRAY
360 PRINT "(13) LIGHT GREEN
370 PRINT "(14) MEDIUM BLUE
380 PRINT "(15) LIGHT GRAY":PRINT
390 PRINT "ENTER YOUR CHOICES":INPUT X,Y
400 POKE 53281,X:PRINT "BACKGROUND--POKING 53281," :X
410 POKE 53280,Y:PRINT "BORDER--POKING 53280," :Y:PRINT "CHARACTER SET--POKING 646," :Y
420 ON X GOTO 440,450,460,430,470,480,490,500,510,500,520,430,530,540
430 POKE 646,1:PRINT "1":RETURN
440 POKE 646,12:PRINT "12":RETURN
450 POKE 646,8:PRINT "8":RETURN
460 POKE 646,11:PRINT "11":RETURN
470 POKE 646,13:PRINT "13":RETURN
480 POKE 646,14:PRINT "14":RETURN
490 POKE 646,9:PRINT "9":RETURN
500 POKE 646,2:PRINT "2":RETURN
510 POKE 646,7:PRINT "7":RETURN
520 POKE 646,15:PRINT "15":RETURN
530 POKE 646,5:PRINT "5":RETURN
540 POKE 646,6:PRINT "6":RETURN
```

# THE CAVERNS OF FREITAG™

For Apple II+ and Apple II e



**ANYONE CAN ENTER,  
BUT ONLY THE MOST SKILLED  
WILL COME OUT ALIVE.**

**MUSE®**  
**SOFTWARE**

347 N. CHARLES STREET, BALTIMORE, MD 21201/(301) 659-7212

Apple is a registered trademark of Apple, Inc.

**CIRCLE 233 ON READER SERVICE CARD**



# images...ibm images...ibm im

While it is usually not expressed in quite this way, there is an old proverb about how every silver lining has a cloud firmly attached to it. Writing this column gives me a chance to experiment with new software and peripherals and express my opinion about them (for whatever it's worth). This is very gratifying for someone who is known to express strong opinions and who, among her other positive attributes, likes the smell of burning disk drives. It has been said that the human organism can get used to anything.

We have become acclimated to eating in the kitchen (the dining room is doing a swell imitation of a software department store), and our friends have become very careful of how they sit down lest they evoke the crunching noise associated with crumpled disks. The cloud that has settled on us consists of alien ship debris. I mean, this column practically didn't get done this month, and it was only with the most incredible self control that I managed to emerge long enough to share my problem with you.

## Cosmic Crusaders

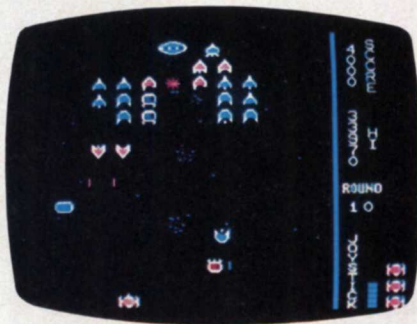
If anyone tried to tell me that I, a sweet, peace-loving individual who will admit to killing only an occasional mosquito, would get hooked on a game, the purpose of which is to slaughter aliens, I would have replied *bushwa* (or words to that effect). This game was brought into

Susan Glinert-Cole, RFD #2, Box 389A, South Windham, ME 04082. Correspondence can only be acknowledged when a stamped, self-addressed envelope has been provided.

## Susan Glinert-Cole

the house by someone I prefer to forget I ever knew; it is terrific and unbelievably addictive. My husband, who used to sidle furtively past the computer with an air of distaste now hangs onto the back of my chair wondering when I will be finished with this column silliness so he can play *Cosmic Crusaders*.

Closet frequenters of video games palaces tell me it resembles *Galaxian*, but it is in a class by itself for the IBM PC (I ought to know, I have been trying out



games for weeks). It is from the same company, Funtastic, which publishes *Snack Attack*—also an excellent game.

*Cosmic Crusaders* is written in assembler, and the action is fast and responsive. The general objective is to mop up alien vessels which appear in formation and then peel off into dives, all the while merrily dropping pink and green bombs

on your ship.

A mother ship appears occasionally; her payload is a bunch of fetching cerise asterisks. The player is allotted five shields to start, and can earn more by hitting the refueling station when it flip-flops across the screen. Eliminating one barrage of ships brings on another set which is faster and nastier. As with most games of this type, you can't win.

The game can be successfully played with the keyboard, and it is possible to change the keys around if you don't like the way Funtastic set it up. We played with this configuration for a couple of weeks (until the game board and the joystick arrived from the same unmentionable person who is obviously trying to ruin my life), and we both found the keyboard set-up comfortable.

There is no question that it is easier to play this game with a joystick; we both beat our highest keyboard scores with the joystick on the second try. The six highest scores can be saved to disk or reset to avoid constant humiliation of one's husband (heh heh).

The sound effects are appropriate to galactic devastation, but are not obnoxiously overt; for those who like the concept of silent havoc, the noises can be turned off. The game is copy protected, which gives me a silent clutch lest something happen to it, but Funtastic will replace it free if it fails anytime.

They tell me that two new games are due out soon: *Big Top* and *Master Miner*. My irresponsible side awaits their arrival with anticipation usually reserved for things like Christmas bonuses.

### Double Sided Disk Drives

I installed a pair of these a few days ago. Their most outstanding feature is their silent operation; with a disk drive cover on, it is barely possible to hear them, and it took a little while to get used to the absence of the grind, grind, grind of the Tandon drives. There were two minor modifications required before installation.

The first was to remove a jumper block from its socket, bend some pins out, and replace it. The second was to remove a resistor network and discard it. Both procedures took a couple of minutes for each drive and the instructions which accompanied them were very clear: I have had no trouble with them at all, and if you haven't converted your IBM PC to double-sided drives yet and would prefer some that are easier on the ear, these drives are no more expensive than Tandon drives and are well worth considering.

### Le Ribbonizer

A few devices have recently appeared on the market which re-ink printer ribbons. I find it objectionable, both on the pocketbook and New England philosophy, to discard a cartridge after only one use, and anything that would alleviate the boredom of winding the ribbon through by hand after reinking the rollers looked like a good bet.

The machine itself is just a motor mounted under a flimsy plastic shell with two felt rollers on the top of the case. For \$39.95 I think the company could have used a sturdier plastic. It isn't that there is a great deal of mechanical stress on the machine, but, because the plastic is so frail, it is necessary to repack it carefully and store it away, because it would not take much to crack the plastic.

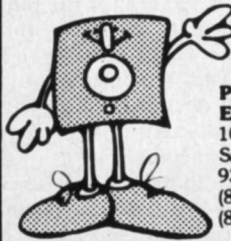
Le Ribbonizer comes with a small bottle of ink, printed instructions and a pair of plastic containers in which to store the rollers after use so the ink won't dry out. The first step is to pre-ink the rollers by repeatedly dropping a bead of ink on the tops of the rollers and waiting until the ink has been absorbed.

The instructions promise that the first time is the worst, and I certainly hope so because the process took about half an hour. The cartridge is secured to the top of the reinker by positioning it on a small metal shaft and then snapping a wire bail over the top. At this point, all that is required is to turn on the motor and spend twenty minutes playing *Cosmic Crusaders*. I can attest to the fact that the motor does not overheat if left unattended for an hour, which was how long the twenty minutes lasted.

The ribbon must incubate overnight in

## Verbatim flexible disks

Call Free (800) 235-4137 for prices and information. Dealer inquiries invited. C.O.D. and charge cards accepted.



**PACIFIC EXCHANGES**  
100 Foothill Blvd.  
San Luis Obispo, CA  
93401. In Cal. call  
(800) 592-5935 or  
(805) 543-1037.

CIRCLE 236 ON READER SERVICE CARD

## SOFTWARE FOR TRS-80 I + III

PEDESTRIAN  
CRASH-OUT  
LEM I

ADDRESS FILER  
FINANCE  
MATH SKILLS

MORE SOFTWARE AVAILABLE  
SOON FOR THE TRS-80 AND  
SINCLAIR ZX81.

WRITE FOR YOUR **FREE**  
CATALOGUE TO:



DDL SOFTWARE, INC.  
PO BOX 116  
WESTTOWN, PA. 19395

TRS-80 IS A REGISTERED TRADEMARK OF THE  
TANDY CORP. SINCLAIR ZX81 IS A REGISTERED  
TRADEMARK OF SINCLAIR RESEARCH, LTD.

CIRCLE 156 ON READER SERVICE CARD

## FREE CATALOG!

Just let us know and we'll mail you a **FREE Creative Computing Catalog**—16 pages filled with books, buyer's guides, magazines, and more!

To get your **FREE** catalog, write to: *Creative Computing Catalog*, Dept NA1X 39 East Hanover Ave., Morris Plains, NJ 07950.

## COMPUTER DESK CADDY PICTURE FRAME



A GREAT GIFT IDEA FOR:

CHILDREN  
OPERATORS  
MANAGERS  
PROGRAMMERS  
UNDERGRADUATES  
TEACHERS  
ENTHUSIASTS  
RETAILERS

PROFESSIONALS  
ENGINEERS  
OTHERS  
PARENTS  
LAWYER  
EXECUTIVES

AN ATTRACTIVE ADDITION TO YOUR  
HOME OR OFFICE

\$12.95 + \$2.00 Shipping & Handling  
N.Y. Residents Add Appropriate Sales Tax  
Allow 4-6 Weeks Delivery  
Send Check Or Money Order To:

**TOMOROSE PRODUCTS, 1204 Avenue U**  
Suite 1152A, Brooklyn, NY 11229

CIRCLE 219 ON READER SERVICE CARD



For Home or Business  
WHAT...WHEN...HOW...

## BE A COMPUTER PROGRAMMER

Train at home in spare time! No previous experience needed! Now you can learn it all! Computer programming...computer applications...computer games...everything you ever wanted to know about computer operations! Write your own computer programs or use hundreds of programs already available...budgeting, real estate, bookkeeping, expenses, investments, interest, taxes, shopping lists, vacation planning, addresses, phone numbers, routing...even foreign languages and graphics.

You'll know what really happens when you have a computer problem with a bank, store, loan company, oil company, utility or anyone else. You'll be able to talk their language...understand why and how things happen...to be able to take the offensive when you're the victim of a computer error. Experts explain everything in easy-to-understand language with step-by-step directions.

• **TIMEX COMPUTER INCLUDED WITH YOUR TRAINING** • Plugs into any TV  
• **SEND FOR FREE FACTS!**



**COMPUTER TRAINING, Dept. DH073**  
Scranton, Pennsylvania 18515

Please rush me free facts and color brochure that tells how I can learn computer applications, programming and operation at home in spare time. No cost. No obligation.

Name \_\_\_\_\_ Age \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_

## IBM, continued...

a plastic bag to distribute the ink evenly and that's it, almost. There is one last thing to do, and it was such a frustrating mess that it made me regret that I was ever unfaithful to my bottle of stamp pad ink. Remember the plastic storage containers? Well, you have to pull the rollers off of their shafts to store them in these canisters. There is absolutely no way to do this without getting ink all over everything, and worse, the little rubber sleeves on the top of the rollers fall off and getting them back on distributes additional ink in an extremely inconsiderate manner. I was so aggravated that I disgustingly tossed the whole machine back in its box.

I suspect that putting the entire machine inside a plastic bag might eliminate the need to store the rollers separately. The next time I reink a ribbon, I will give this method a whirl. Ben Torres Ribbon Service also sells new and reloaded ribbons which I might revert to if the above solution doesn't pan out.

### DOS 2.0

I finally borrowed a copy of this new operating system a few days ago; there doesn't seem to be an extra copy anywhere at the time of this writing, and I haven't had a chance to delve into it thoroughly. The newest version has so many improvements and enhancements that it would be impossible to cover all the additions in one column, so I will dance across the high spots (and the low ones too).

There are a few gripes I have about DOS 2.0 that are minor, but irritating. The organization of the documentation

is appalling. Information on the same subjects, like tree-structured directories, is scattered throughout the notebook. Some of the information is listed under the hard (fixed) disk chapter, some in the chapter on tree structured directories and some in the section on DOS commands.

The organizational problem pales in comparison to a slightly broken ring binder. DOS 2.0 is too big for the binder supplied with it, and, with one of the rings misaligned, it is not possible to flip easily through the book without the pages coming out of the rings; they then get torn and lost, and trying to find anything is a real megillah.

Why IBM cannot supply section dividers is beyond my comprehension. If the documentation is organized (or disorganized) in such a way that you are forced to keep paging through it, a set of dividers would ease that pain considerably. As it stands now, I buy packages of little dividers and make my own but there is probably an enterprising soul out there who could design and print a nice set (there is a ready customer right here). Having griped my gripes, I move right on to some of the high points.

The non-system programmers will find three completely new features immediately appropriate for their use: input/output redirection, filters, and hard disk support (including a new type of directory structure). I will talk primarily about these features this month.

Device redirection, or "piping," as it is sometimes called, allows a program or batch file to get its input from and direct

its output to any file which can send or receive a stream of data. Suppose, for example, you wish to create a file by using `COPY CON:FILEA`. Normally, this will take the input you type from the keyboard and write it to `FILEA`. It is now possible to redirect the output to the printer by typing

```
COPY CON:FILEA > PRN.
```

In this manner, it is easy to get a directory listing sent to the printer by typing `DIR >PRN` or, if a file containing the directory is wanted, `DIR >DIRFILE` will send the directory to `DIRFILE` on the default disk drive. Redirecting input is just as simple.

Suppose in a batch file you wish a program to receive its input from another file instead of from the keyboard; inserting the command `THISPROC <THATPROC` causes input to `THISPROC` to come from `THATPROC`. This feature eliminates a great deal of file opening and closing from inside a program; the system will do it for you.

There is a slightly different format for piping when using the output of system commands as input for another system command, which I will talk about in the next section.

My favorite additions to DOS are the filters now supplied with it. A filter is a program which takes data from some specified input device, modifies it, and then writes the modified information to an output device. DOS 2.0 now contains three of these very useful programs: `FIND`, `SORT` and `MORE`.

The `FIND` filter is *wonderful*. This command takes all lines from the file specified which contain (or do not contain) a specified string and sends them to any specified output file. I had planned, in the next month or so, to write a program which would remove all remarks contained in a Basic program. This project is now unnecessary thanks to `FIND`. The only caveat in using this filter for this purpose is that all remarks must be on a separate line in the program, since `FIND`, when used in this way, removes the entire line. Naturally, the program must be saved as an ASCII file. The format of the command is as follows:

```
FIND [/V] [/C] [/N] "string"  
[[d:] [path] filename  
[.ext]...]
```

This looks pretty terrible, but is not really quite as confusing as it seems. The command `FIND "rem" B:TEST1.BAS` will list to the console all the lines in `TEST1.BAS` (on drive B) which contain the string "rem." This is not exactly what is wanted in this case, since we want to remove all lines with this string.



*How's this for inspiration? Let's junk the novel and start designing computer software.*

The command `FIND/V "rem" B:TEST1.BAS` will display all the lines that do *not* contain the string "rem." This is better, but listing the program to the console is an academic exercise. What is really needed is some way to save the filtered program. A little redirection of the output in the form:

```
FIND /V "rem" B:TEST1.BAS
>B:TEST1.REM
```

will find all lines which do not contain "rem" and write them to TEST1.REM on drive B. Fantastic! More than one file may be filtered at a time by simply listing the files, separated by a space, after the string parameter. Now suppose you want to locate all of the entries in a file directory which contain the string "txt." As mentioned above, this type of redirection has a slightly different syntax, as we are dealing with the output from a system command, as opposed to a file.

This format uses the double bar located above the reverse backslash on the keyboard (this is not a colon) and looks like this:

```
DIR ! FIND "txt" >B:TXT.TXT.
```

This command would take the entries for the directory on drive A, find all file names that contained "txt" and would write them to file TXT.TXT on drive B.

The /C parameter causes FIND to display the number of matches of the string it found in each file without actually displaying the lines containing the string. The /N parameter outputs the relative line number of each match ahead of the line from the file.

Another pleasant feature of DOS 2.0 is the SORT filter. This command will sort lines of data according to the ASCII collating sequence. The format is:

```
SORT [R] [/+n]
```

where the /R option will sort in reverse order and the /+n parameter (n is an integer) will begin the sort starting with column n. This feature is most useful in sorting directories. For example:

```
DIR ! SORT >B:SORTED.DIR
```

would sort alphabetically the directory on drive A and write the sorted list to SORTED.DIR on drive B.

The third filter available is the MORE command. This command will read data from an input file and send one screenful at a time to an output device, pausing with the pregnant message—More—. To display another screenful, press any key. The format looks like this

```
MORE <B:TEST1.BAS.
```

This would display one screenful at a time of TEST1.BAS, found on drive B to the console.

With DOS 2.0 it is now possible to queue files for printing and still be able to do other jobs while the printer is merrily chugging away. Up to ten files can

be lined up for outputting at any one time and global file names are allowed in the queue. The format looks like this:

```
PRINT [[d:] [filename[.ext]]
[/T] [/C] [P]...]
```

The /T parameter is the terminate command and it cancels all files from the print queue. The /C sets the cancel mode and permits selection of the files which you wish to delete from the queue. The /P sets the print mode again.

```
PRINT FILE1 FILE2 FILE3
B:FILE4 FILE5 FILE6
```

would put these six files in the print queue and send them to the printer. If you wish to stop the whole process, type PRINT/T. If you want to delete the last two files from the queue, type PRINT FILE5/C. If only FILE5 is to be deleted type PRINT FILE5/C FILE6 /P.

The printer is the default device for this command, but files may be queued in this manner to any output device (e.g. COM1, AUX, LPT1).

The most important feature of the new DOS is the fixed disk support, which introduces a new structure for file directories. The old versions of DOS used a linear directory structure in which each disk contained one directory under which all the files on that disk were listed. These directories could hold a maximum of 64 files (for single sided disks) or 112 files (for double sided disks). This scheme worked reasonably well for disks that did not contain many files; I did find it bothersome when the number of files exceeded about 20 per

disk, especially if programs, correspondence, and graphics programs were all mixed up.

My backup disks tended to be chaotic, since I would grab anything that had room for a backup on it, promising myself that some rainy Sunday I would carefully reorganize everything. While Maine has enough rainy Sundays to reorganize the Library of Congress, the task never got finished. With the new DOS however, it is possible to organize groups of related files into their own subdirectories. This is absolutely essential for a hard disk, which may contain thousands of files, but it is very convenient for floppies too, if there are several short files which could be categorized according to type.

DOS 2.0 uses a tree data structure for file organization. The two types of data structures are shown in Figure 1.

In DOS 2.0, when a disk is formatted, a main, or root, directory is created. The main directory may contain files or subdirectories and these subdirectories (which are actually files themselves), may in turn contain files and subdirectories. When DOS is booted, the main directory is always the current one, but any subdirectory may be designated as the default by issuing a CHDIR (Change Directory) command:

```
A>CHDIR [d:] path
```

The path is the route to the subdirectory of choice. In the figure above, the path to SUBDIRECTORY1 is:

```
A>CHDIR /SUBDIRECTORY1
```

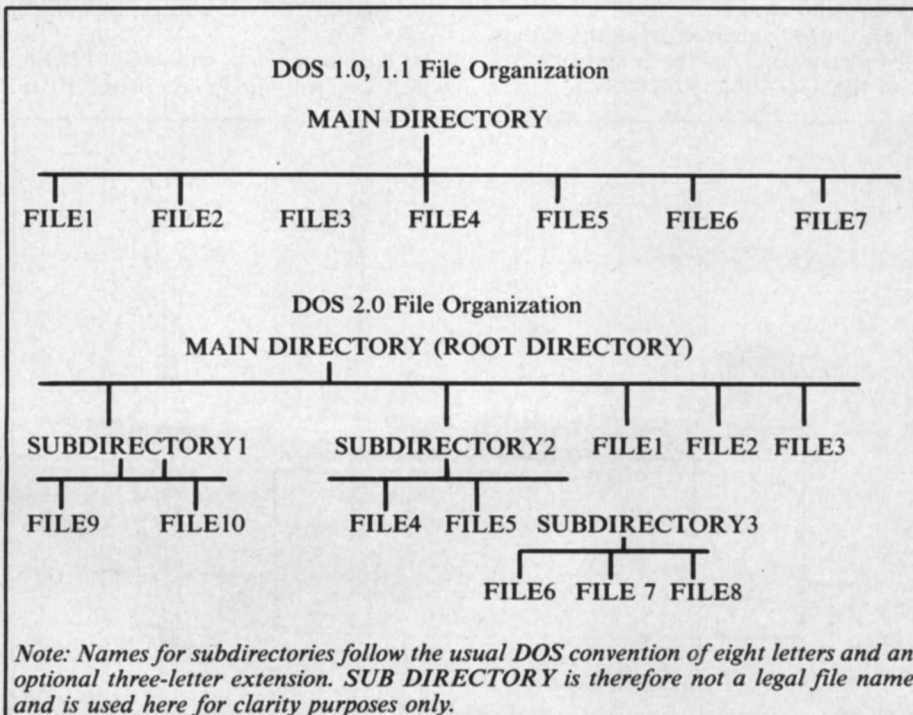


Figure 1.

## IBM, continued...

(SUBDIRECTORY1 is now the current directory) and the path to SUBDIRECTORY3 is:

```
A> CHDIR/SUBDIRECTORY2/
SUBDIRECTORY3
```

(SUBDIRECTORY3 is now the current directory)

To return the system to the root directory as the default, use CHDIR with no parameters:

```
A> CHDIR/
```

Creating subdirectories is done using the MKDIR command. To create the file structure above, three commands are needed. Each command creates one subdirectory and the parent directory must exist before a subdirectory may be created in it.

```
A> MKDIR/SUBDIRECTORY1
A> MKDIR/SUBDIRECTORY2
A> MKDIR/SUBDIRECTORY2/
SUBDIRECTORY3
```

The third command could also be accomplished by making SUBDIRECTORY2 the default directory and then specifying any subdirectories:

```
A> CHDIR/SUBDIRECTORY2
A> MKDIR/SUBDIRECTORY3
```

Removing subdirectories is a simple matter of using the RMDIR command, but the subdirectory must be empty of all files before it may be removed. Neither the root, nor the current directory (if different than the root) may be removed with this command. The format is:

```
RMDIR[d:]path
```

where the last subdirectory in the path is the one erased. Thus the command:

```
A> RMDIR/SUBDIRECTORY2
```

removes SUBDIRECTORY2 and  
A> RMDIR/SUBDIRECTORY2/  
SUBDIRECTORY3  
removes SUBDIRECTORY3.

Well, that's swell, you are all saying, but how do I get *files* into these directories? This is simply a matter of specifying the appropriate path when the file is created (and I had to explain the idea of a path first, right?) So let's create the file structure in the thoroughly unimaginative figure above.

```
A> COPY CON:SUBDIRECTORY1
/FILE9
<anything + CONTROL 2>
A> COPY B:FILE10:
SUBDIRECTORY1/FILE10
```

The first command takes FILE9 from the console and puts it into the subdirectory; the second copies FILE10 from drive B to drive A (the default here) and puts it into SUBDIRECTORY1. Files 1, 2 and 3 are placed in the main directory with:

```
A> COPY B:FILE1
A> COPY B:FILE2
A> COPY B:FILE3
```

(Or any variation of global specifications, such as FILE or FILE?)

To put files into SUBDIRECTORY3, follow the same procedure as above, but use the appropriate path:

```
A> COPY CON:SUBDIRECTORY2
/SUBDIRECTORY3/FILE6
A> COPY B:FILE7:
SUBDIRECTORY2
/SUBDIRECTORY3/FILE7
A> COPY B:SUBDIR13/FILE8:
SUBDIRECTORY2/SUBDIRECTORY3
/FILE8
```

This last command will copy FILE8, which it will find on drive B in

SUBDIR13, to SUBDIRECTORY3 on drive A.

Directory listings for this type of file structure is done a bit confusingly. Typing a simple DIR command gives only the files and subdirectories listed in the root directory, not a listing of all files found on the disk. It is necessary to specify which directory you wish the files to be listed for and only the files in that particular directory are displayed. The accompanying listings show exactly what the outcome is for each request. At this point I think you get the idea of paths, and I intend to take the fastest one back to my joystick. □

### Names and Addresses of Firms Mentioned

Funtastic Inc.  
5-12 Wilde Ave.  
Drexel Hill, PA 19026

Ben Torres Ribbon Service  
416 East State St.  
Redlands, CA 92373

### Route directory.

Volume in drive B has no label  
Directory of B:\

```
SUBDIR1 <DIR> 1-01-80 12:41a
SUBDIR2 <DIR> 1-01-80 12:41a
FILE1 42 1-01-80 12:41a
FILE2 57 1-01-80 12:42a
FILE3 59 1-01-80 12:42a
5 File(s) 349184 bytes free
```

### Directory of subdirectory 1.

Volume in drive B has no label  
Directory of B:\subdir1

```
. <DIR> 1-01-80 12:41a
.. <DIR> 1-01-80 12:41a
FILE9 34 1-01-80 12:43a
FILE10 142 1-01-80 12:43a
4 File(s) 349184 bytes free
```

### Directory of subdirectory 2.

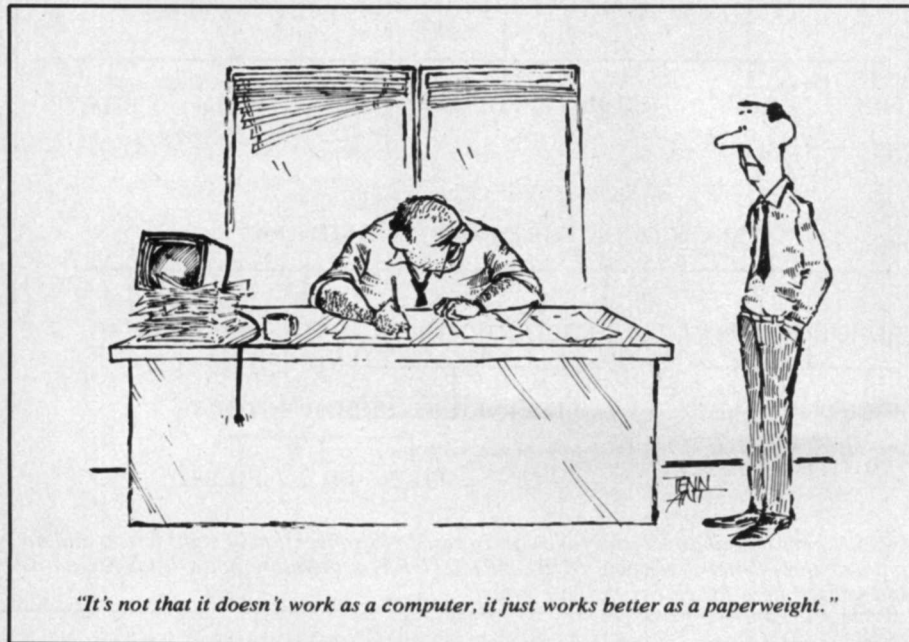
Volume in drive B has no label  
Directory of B:\subdir2

```
. <DIR> 1-01-80 12:41a
.. <DIR> 1-01-80 12:41a
SUBDIR3 <DIR> 1-01-80 12:41a
FILE4 159 1-01-80 12:44a
FILE5 176 1-01-80 12:44a
5 File(s) 349184 bytes free
```

### Directory of subdirectory 3.

Volume in drive B has no label  
Directory of B:\subdir2\subdir3

```
. <DIR> 1-01-80 12:41a
.. <DIR> 1-01-80 12:41a
FILE6 167 1-01-80 12:45a
FILE7 226 1-01-80 12:46a
FILE8 316 1-01-80 12:46a
5 File(s) 349184 bytes free
```



# OUR ISOLATORS FOR YOUR PROTECTION

## Prevents:

disk drive woes, printer interaction,  
memory loss and damage due to  
lightning or AC power line  
disturbances.



## Commercial Grade Isolators

ISO-1	3 Isolated Sockets	\$76.95
ISO-2	2 Isolated Socket Banks, 6 Sockets	76.95

## Industrial Grade Isolators

ISO-3	3 Double Isolated Sockets	115.95
ISO-11	2 Double Isolated Banks, 6 Sockets	115.95

## Laboratory Grade Isolators

ISO-17	4 Quad Isolated Sockets	200.95
ISO-18	2 Quad Isolated Banks, 6 Sockets	169.95

Circuit Breaker, any model (Add-CB)	Add 10.00
Remote Switch, any model (Add-RS)	Add 18.00

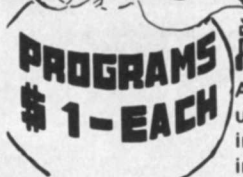
**ESP® Electronic Specialists, Inc.**  
171 South Main Street, Box 389, Natick, Massachusetts 01760

Toll Free Order Desk 1-800-225-4876  
MasterCard, VISA, American Express

CIRCLE 172 ON READER SERVICE CARD

**NEW!!** The Apple users group software library bonanza at truly affordable prices. For the first time enjoy your Apple to its fullest capacity using specially packed disks with over **60 outstanding programs each**. Not available from any other source!

• Applesoft • 3.3 DOS



**APPLEWARE INC.** offers

An extensive variety of interesting, useful and entertaining programs indispensable to the serious computerist including:

Business	•	Educational	•	Graphics
Games	•	Music	•	Science
Utilities	•	Data Base	•	Finance . . .

Library disks 1, 2 & 3 are mixed categories and new disks 4 (Games), 5 (Utilities), 6 (Graphics) & 7 (Integer) at \$59.95 each. Why pay more?

Order direct from this ad and **Save up to \$136**. Buy disk library package 1, 2 & 3 and get a special bonus disk **FREE** — over **260** programs for \$179.95 + shipping. For best value, get all 8 disks for \$349, postage prepaid, for over **530** of our best programs at 65¢ each! Call now toll free: 1-800-327-8664  
Florida: 1-305-987-8665

6400 Hayes St.  
Hollywood, FL 33024



CIRCLE 110 ON READER SERVICE CARD

# SHELF CONSCIOUS?

## Now you can organize your copies of CREATIVE COMPUTING

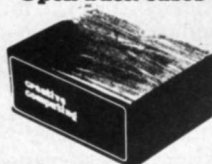
Now your magazines can be a handsome addition to your decor, well organized, and easy to find, thanks to these durable library-quality cases or binders. They're made of luxury-look leatherette over high-quality binder board. And both styles are custom-designed for this or any other magazine you save, with size, color and imprint selected by the publisher. FREE transfer foil included for marking dates and volumes.

## Magazine binders



holds your issues on individual snap-in rods, combining them into one volume. \$7.95 each; 3 for \$22.50; 6 for \$42.95. Mixed titles OK for quantity prices.

## Open-back cases



store your issues for individual reference. \$6.95 each; 3 for \$19.75; 6 for \$37.50. Mixed titles OK for quantity prices.



For faster service,  
**CALL TOLL-FREE 800-526-0790**  
(In NJ only 201-540-0445)

## Creative Computing

P.O. Box 5120, Philadelphia, PA 19141

Please send: ☐ Cases ☐ Binders

TITLE \_\_\_\_\_ QUANTITY \_\_\_\_\_

Creative Computing \_\_\_\_\_

Other: \_\_\_\_\_

☐ PAYMENT ENCLOSED \$\_\_\_\_\_ \* Add \$1.00 per order for postage and handling. Outside USA add \$2.50 per unit ordered; send US funds only.

☐ CHARGE (Minimum \$10):

☐ American Express ☐ MasterCard

☐ Visa

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_

\*Residents of PA add 6% sales tax.

# Use All 20 Fingers

**Fastype** reduces typos and spelling errors while increasing speed.

Word processors are nice. Spelling checkers help. But a key-stroke still takes time.

Now **Fastype** eliminates wasted keywork by supplying abbreviations for frequently used words. Just type 't' for 'the', 'io' for 'information', 'oe' for 'of the'. You just enter the code for a word and **Fastype** fills in the rest automatically.

**Fastype** knows codes for 500 frequently used words and word phrases.

Allows you to create a user-defined table of mnemonics for your special words or word phrases.

Just use your word processor to create a quick file, then invoke **Fastype** to generate your full text.

Minimum Requirements: 56K CP/M System with at least one drive

Only \$29.95 (Disk and Manual)

To order

call: (614) 261-8697

Phone orders shipped within 24 hours

or write:

☐ check enclosed (no C.O.D.)

☐ MC ☐ VISA exp. date \_\_\_\_\_

Number \_\_\_\_\_

Signature \_\_\_\_\_

☐ 5 1/4" hard

☐ 5 1/4" soft

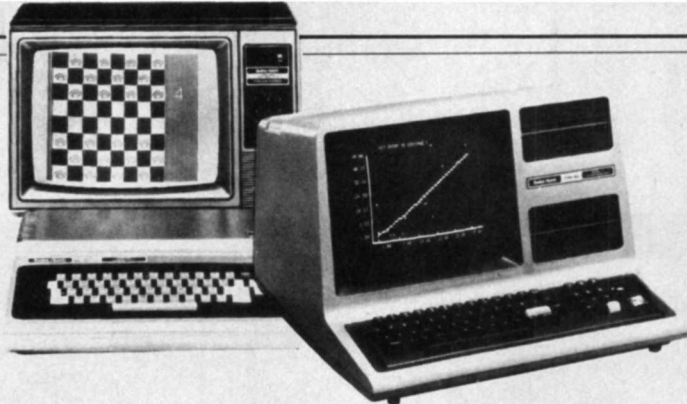
☐ 8"

Mail to:

**Cowtown Software, Inc**  
128 West California Avenue  
Columbus, Ohio 43202

CP/M is a registered trademark of Digital Research Corp.

CIRCLE 135 ON READER SERVICE CARD



# rings...trs-80 strings...trs-8

As our Radio Shack balloon rises past the 54,000-foot altitude level, we pause to check out a disk catalog program from Sams, the Color Computer Quick Reference Guide, six Color Computer programs from Computerware, and another short screen saver program.

## AOS Back to INpolis, Renamed Sams

The first software offered by Howard W. Sams & Co., the technical book publisher, was marketed under the Advanced Operating Systems label (Dec. 1981, p. 322).

AOS was moved from Indianapolis to Michigan City, IN, because the head of the division wanted to live there. He left after a year and a half, AOS moved back to Indianapolis, and the Sams name replaced the AOS name as of December, 1982.

The Sams catalog now includes software, in addition to the type of books that made the company famous. There are programs for the TRS-80, Apple, IBM PC, Commodore and Timex/Sinclair personal computers in areas such as business, word processing, games, electronic engineering, and communications.

We'll be looking at several Sams software products, starting with a disk catalog program in this issue.

## Disk Catalog

After you have filled your first disk and have to start a second one, you begin to have trouble keeping track of what program or file is on which disk.

One solution is to keep all programs or files of a particular type on one disk. Keep all the Basic programs on one disk, *Scripts* files on another, etc. But once you have filled the Basic disk or the *Scripts* disk, the problems begin again.

## Stephen B. Gray

Incidentally, one way of keeping track of what is recorded is to use extensions. When someone sends me a letter containing a program for the Short Program section of this column, I first enter the program in Basic with a /BAS extension and a number to indicate the sequence of letters, such as LET037/BAS. Then I type the letter itself in *Scripts*, using the same letter number but a different extension: LET037/SCR, and call the Basic program from *Scripts*.

Thus, I know the program part of the Short Program item is correct, because I entered it in Basic and ran it before storing it. Using extensions, I keep the letter text separate from the Basic program, for separate printouts later: the letter with a daisywheel printer; the program with a dot-matrix printer, in case the editor would like to use a more authentic-looking listing.

## Master Directory III

However, even with extensions, there comes a time when the only way to go is with a master disk directory program (also called a disk catalog program). A very good one is *Master Directory III*, for a TRS-80 Model III with 16K of memory and at least one disk drive, \$39.95 at computer stores or, with a \$2 charge per order for handling, from Howard W. Sams & Co., Inc., 4300 West 62 St., Indianapolis, IN 46206.

Using this program couldn't be simpler. Just put the Sams disk in drive 0 and press the reset button. You get a menu with nine choices. At the beginning, you have only one: read the directories from your disks.

After you have assigned each disk a

unique number from 0 to 999, and put the number on each disk label, just put each disk in drive 1 (or if you have only one drive, switch the Sams disk and your disks back and forth), give the number of the disk and press ENTER. *Master Directory III* is compatible with almost any DOS, so there is no problem if a disk was made with TRSDOS or DOSPLUS or whatever. Do the same thing with all your disks, and within minutes you have created a master directory that allows you to search for a program or file in several different ways. The system provides seven different reports, which can be displayed or printed out.

You can also catalog an 80-track disk, and read invisible files into your directory.

## Searching the Directory

You can ask to see the directory for a disk by entering its number after asking for item 1 on the menu, Disk Directory. If you have any doubt about a particular disk having been cataloged, ask for the Master Disk Listing, which lists all disks in the master directory by name, number, number of free granules, date cataloged, etc.

If space is tight, you can Search For Free Space by specifying how much you need. You can delete the directory for any particular disk, which is necessary, for example, if you want to read in an updated directory.

The most useful command of the system is File Name Search. Just ask for item 6 on the menu and type in the name of the file you want. If you want to see a group of file locations with similar names, use a ? as part of the file name, which means that that letter doesn't matter. If you fill the rest of the filename

with ? then you'll get a listing of all files with that name plus all longer names that begin with that name.

If you have forgotten the name of a program or file, or just want to look through the names of everything you have on disk, ask for the Master List Filing, which provides a full directory of all disk programs, in alphabetical order.

If you know the name of the disk you want (and have given each disk a different name), choose File Listing By Category. To get a report for a requested extension, ask for item 9, File Listing By Extension, which will display and/or print all programs or files using that

extension, whether it is SCR or BAS or CMD or PAS or whatever (Figure 1).

That's just about all there is to it. There is no simpler way of keeping track of all your disk files and programs than with the Sams *Master Directory III*.

#### Quick Reference Guide

A handy new publication, Radio Shack's new \$4.95 "TRS-80 Color Computer Quick Reference Guide" is a 71-pager to keep near your computer for a fast lookup.

The guide has just about everything you need for quick reference, including everything that is on those foldout cards

that come with the manuals, plus a lot more.

You get nine pages of all the statements, color-coded to indicate which are only for Extended Color Basic, and which are only for Disk Extended Color Basic. Then come lists of functions, ROM subroutines, control keys, color codes, ASCII codes, editor commands, ZBUG commands, 6809 instructions, editor/assembler error messages, memory map, Basic error messages, technical specifications, and many more.

This 4" by 8" guide is wire-bound to stay open beside your Color Computer. Once you have gone through the manuals, this is what you need for quick reference.

#### Six Programs from Computerware

Four games, a money manager, and a tutorial for the Color Computer were sent by Computerware (Box 668, 4403 Manchester Ave., Suite 102, Encinitas, CA 92024). The four games are all quite exciting, and well worth checking out. The money manager is a sophisticated checkbook balancer, but the tutorial is too expensive for what it contains.

#### Bloc Head

The game of *Bloc Head* (\$26.95 cassette, \$29.95 disk) presents a grid of 27 cubes. You are the Bloc Head, and the object is to change the color of the top of each cube to the color indicated in a corner of the screen. All you have to do is use the joystick to move from one cube to another, and the color changes as you land on each.

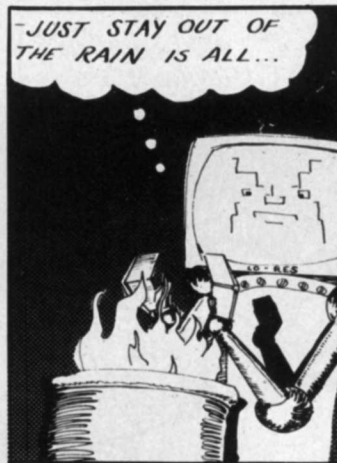
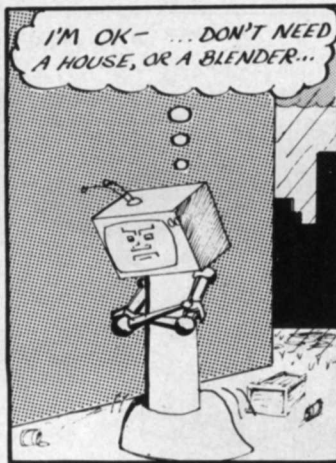
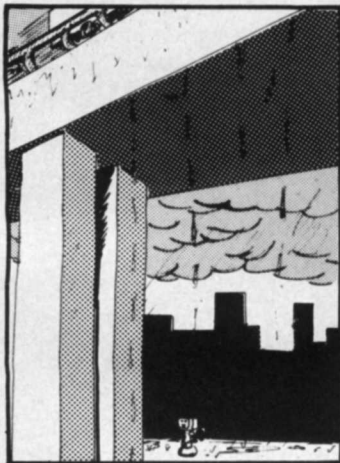
There are problems, of course. Several monsters will try to jump on you, which could take one of your four lives. If you aim away from the cube grid, you might fall off the edge. But if you can change all the cubes to the new color, you get

#### MASDIR 1.2 - File search - 04/22/83

Filename	Ext	Disk #	Sec	Type	Attrib
PATCH	BAS	1	6	NOR	EXEC
PATCH	BAS	2	6	NOR	EXEC
INT	BAS	2	1	NOR	TOTAL
LET006	BAS	2	1	NOR	TOTAL
LET001	BAS	2	2	NOR	TOTAL
LET008	BAS	2	3	NOR	TOTAL
LET004	BAS	2	4	NOR	TOTAL
LET005	BAS	2	1	NOR	TOTAL
TY1	BAS	2	1	NOR	TOTAL
LET007	BAS	2	2	NOR	TOTAL
LET105	BAS	2	1	NOR	TOTAL
SO1	BAS	2	1	NOR	TOTAL
LET002	BAS	2	2	NOR	TOTAL
PATCH	BAS	3	6	NOR	EXEC
LET008	BAS	3	2	NOR	TOTAL
LOT2	BAS	3	3	NOR	TOTAL
LOT1	BAS	3	2	NOR	TOTAL
LOTTO	BAS	3	11	NOR	TOTAL
LET000	BAS	3	2	NOR	TOTAL
KAL	BAS	3	1	NOR	TOTAL

Figure 1. This Master Directory III report shows programs and files written in Basic and named with the /BAS extension.

## BitPit



## Chas Andres

## TRS-80, continued...

bonus points and start all over again.

There are "easy" and "tuff" levels in this intriguing game that will have you jumping all over the screen to change cube colors without getting wiped out.

### Nerble Force

You are one of the last human survivors on Nerble, and your goal, as pilot of the last human spaceship, is to defend the planet against the Nerble Force. You control your ship (which has four lives) with the joystick, and fire phasers with the button.

Six types of Nerbloids make life difficult, and must be shot down or avoided. One or two humans can play, at four levels of difficulty, and the game can be frozen (for later unfreezing) or reset at any time.

The action is exciting, as you pilot your ship left and right, up and down, firing away at targets, avoiding mines, always watching the long-range scanner at the bottom of the screen that tells you where the aliens are.

A nice touch: if there are five or more aliens on the screen when you die, your ship supply will not decrease. This lets you "kamikaze" when surrounded, for \$24.95 on cassette, \$29.95 on disk.

### Gran Prix

The longer you stay on the track without crashing, and the faster you drive in this 32K game, the more points you get. Moving the joystick forward or back controls your speed; moving it left and right controls your steering in the high-powered racer.

Just to keep you on your toes, you'll sometimes have to drive at night, or on snow covered roads. You have 100 seconds to rack up points, but if you can get over 2000 points, you earn extended play, in this fast-moving game you will play over and over. The program keeps track of the top ten scores, and is \$21.95 on cassette, \$25.95 on disk.

### Moon Hopper

This 32K game (\$24.95 cassette, \$29.95 disk) uses an advanced type of moon buggy, with a "secret feature" that allows it to jump over obstacles instead of going around them. On Space Patrol maneuvers, you are attacked by Traglons, so you try to hold them off with phasers while racing to the moonbase for reinforcements. Can you make it before the Traglon saucers blow you to bits?

Choose one of five levels of play, and use the joystick to control speed and direction, the button to fire the phasers. You jump the hopper by moving the joystick upwards for a moment, to leap over craters. Boulders can be jumped or shot.

A long-range scanner at screen bottom tells you how close you are to the base, and you get points for vaporizing aliens and boulders, in this heart-stopping race for life on a dead moon.

### Home Money Manager

This is a \$29.95 disk based, menu driven, personal checkbook system that "tracks data by Date, Paid To, Check Number, Account Number, Amount of Check, and Current Balance," according to the brief eight-page manual.

The program shows exactly how much you spent on what, and where your income came from. Up to 480 transactions can be recorded.

To use the program, you create a new checkbook file, entering your current balance and information on checks written, assigning an account code to each check. After the data for each check is entered, the new current balance is displayed. Deposits are entered in the same manner.

You can easily make corrections, view files, change account names, and update the balance. Four reports can be printed out, if you have an 80-column printer: transactions (deposits and expenses),

deposits, expenses, and accounts (year-to-date).

A demonstration file is provided; "It is recommended that you practice with this file so you can make any mistakes on it instead of your own data," the manual says.

This program is fairly sophisticated, and can be recommended to those who find the ordinary check registers provided with checkbooks to be too simple for their needs. (Although the manual says this is a disk based program, Computerware quoted me a \$19.95 price for cassette.)

### Intro to Data Communications

This five-part Extended Basic program is said by the five-page manual to be designed "to teach a beginner the basic ideas and terminology to allow him (her) to use a data communications device easily."

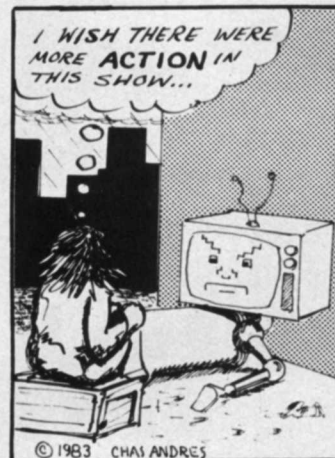
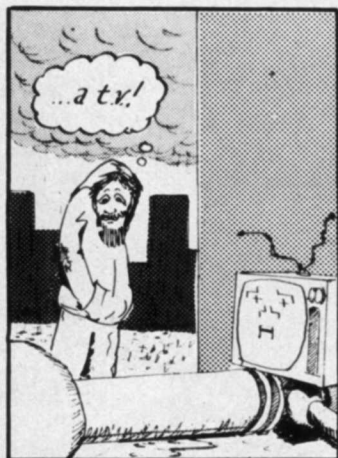
The first four parts teach very elementary theory about modems, RS-232, synchronous transmission, baud rate, etc. A dozen illustrations make good use of color graphics. The fifth part is a multiple choice test with ten questions.

This program is \$17.95 on cassette, \$22.95 on disk. For \$12.95, you can buy "TRS-80 Data Communications Systems," by Frank J. Derfler Jr. (Spectrum Books, Prentice-Hall Inc.) which, although disappointingly flawed, gives you a great deal more information, is much easier to read than a Color Computer screen, and has three dozen illustrations, and two dozen charts.

### Short Program #41: Screen Saver III

From Valley Stream, NY, Matt Fitzgibbon wrote last year, "Lately I've seen, in computer magazines, many programs for saving the contents of the TRS-80 screen to string or numerical arrays." One of these is Short Program #31 (July 1982, p. 222).

"This program shows one strong fault



of screen-save programs written in Basic: they are generally very s-l-o-w! At least they used to be slow. I have been using computers since my freshman year in high school (about three years) and some time ago I wrote a program (entirely in Basic) which takes about one second to store the program.

"I'm sure that at one time or another, most TRS-80 owners have seen programs which use VARPTR to look at the variable pointer of a string. I reasoned that this function could also be used to change the pointer of the string and fool the computer into thinking that the video memory is nothing more than several string variables.

"The program in Listing 1 illustrates this technique. The screen is completely saved (except for the last four bytes) in SC\$, from which it is printed back onto the screen. The part of the program that does the actual saving runs from line 70 to line 150.

"If anyone wants to use this as a subroutine in a marketed program, I ask nothing more than a simple REM."

"Lines 20-60 create a four-way kaleidoscopic graphics image; lines 70-150 save it; lines 160-170 reprint it on the screen."

Matt's program includes these REMs: "Line 10 puts some text on the screen; lines 20-60 put some graphics there too. In line 70, A\$ will point to 255 consecutive bytes of video memory, and line 80 finds the pointer to the location of A\$. In line 100, SL is the pointer to which 255-byte block of video is to be read; line 110 sets up bytes so we can make A\$ point to location SL. In line 130, A\$ is now pointing to the video. Line 140 saves this portion of the screen in array SC\$. Line 160 clears the screen and reprints it from SC\$."

Matt added a P.S., "Because this 'screen-save' stores graphics and is extremely fast, it can be used in the multitude of 'Etch-A-Sketch' programs. Screens can be saved to disk by simply saving the strings, SC\$(0)-SC\$(3)." □

#### Listing 1.

```
0 CLS: CLEAR 2000: DIM SC$(3)
10 PRINT "Screen Save---Fitzgibbon"
20 FOR F = 1 TO 50
30 X = RND(63): Y = RND(20)+3
40 SET(X,Y): SET(127-X,Y)
50 SET(127-X,47-Y): SET(X,47-Y)
60 NEXT F
70 A$ = STRING$(255,0)
80 PT = VARPTR(A$)
90 FOR F = 0 TO 3
100 SL = F*255+15360
110 MSB = INT(SL/256)
120 LSB = SL-MSB*256
130 POKE PT+1, LSB: POKE PT+2, MSB
140 SC$(F) = A$
150 NEXT F
160 CLS: FOR F = 0 TO 3
170 PRINT SC$(F): NEXT F
180 GOTO 180
```

**5 Year Warranty**  
**SAVE 50% ON**  
**Verbatim Datalife**  
**Diskettes**

DEALER INQUIRIES INVITED

Specify Soft	10 or 16 Sectors	prices/10
MD525 1 side/dbl dens.		\$24.90
MD550 2 sides/dbl dens.		\$35.00
MD577 1 side/quad 96tpi		\$33.75
MD557 2 sides/quad 96tpi		\$44.50

**8"** Specify Soft or 32 Sector

FD34-9000 1 side/sgl dens.		\$30.00
FD34-8000 1 side/dbl dens.		\$33.00
DD34-4001 2 sides/dbl dens.		\$41.00

Checks-VISA-MC-C.O.D./Add \$2 Shipping  
 Call or write for our discount catalog.

**LYBEN COMPUTER SYSTEMS**  
 27204 Harper Ave., St. Clair Shores, MI 48081  
 Phone: (313) 777-7780

DATALIFE • THE NAME IS THE PROMISE  
 THE WARRANTY IS THE PROOF

CIRCLE 154 ON READER SERVICE CARD

**NEW 5 1/4" STORAGE**  
**Vu Case II**  
*Highly Versatile Protection*

**Carry it. Stack it. Lock it. Hang it.**

- Stores 50 5 1/4" diskettes
- 1 year warranty
- Built-in retractable handle
- Includes index set
- Contents are visible
- Cover easily removable
- Ribbed for solid stacking
- Made of super strong Lexan®

**\$29.95**  
*Delivered Price*

**ORDER NOW** and receive **FREE**  
 wall mounting hardware  
 Call for quantity prices

**Software Services™**  
 1326 - 25th St. S., Suite D  
 Fargo, ND 58103  
**1-800-MEGABIT**

CIRCLE 199 ON READER SERVICE CARD

**GLOUCESTER COMPUTER**

FD/EA, all features of Promqueen less mimic mode. Software enhanced to include EPROM QC utilities, RS-232 communication, printouts. 28 pin ZIF socket.

Reads, edits runs and programs all 5 volt 2500 and 2700 series EPROMS plus variety of EEPROMS all without personality modules. Commodore C-64 host computer. Inquire about the mimic mode capability in our VIC Promqueen.

**\$299.00**

**ROM Packs** Industrial quality circuit cards are socketed, solder masked, fully bypassed, and include a ground plane for low noise operation. Includes 1 EPROM. 8K & 16K models for VIC-20 and C-64. Specify 2732 or 2764 EPROM type. Molded plastic case.

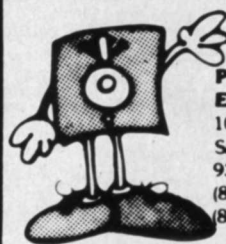
**\$39.00**

**GLOUCESTER COMPUTER**  
 1 Blackburn Center, Gloucester, MA 01930 617-283-7719

CIRCLE 146 ON READER SERVICE CARD

## MEMOREX FLEXIBLE DISCS

**WE WILL NOT BE UNDER-SOLD!** Call Free **(800) 235-4137** for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



**PACIFIC EXCHANGES**

100 Foothill Blvd.  
 San Luis Obispo, CA  
 93401 In Cal call  
 (800) 592-5935 or  
 (805) 543-1037

CIRCLE 236 ON READER SERVICE CARD

**NEW!**

**ENERGY-SAVE**  
**EASY-TO-USE MICRO SOFTWARE**

**SIMPLIFIED BUILDING ENERGY ANALYSIS FOR BUILDERS, ARCHITECTS, LENDERS, UTILITIES AND HOME BUYERS**

- Energy savings for 6 conservation and 3 solar measures
- Net cost savings and payback
- Complete data base

**PEACHTREE ASSOCIATES**  
 316 Lamont Dr. P.O. Box 1312 Decatur, GA 30031  
 (404) 373-3000 Dealer inquiries invited

CIRCLE 170 ON READER SERVICE CARD

## LOWEST PRICES

### BASF Qualimetric Diskettes

- Same-day shipping
- Dealer Inquiries Invited
- VISA/MC accepted

**Call Toll Free**

**(800) 221-3460**

In CA, call (800) 821-6668



3024-B De la Vina  
 Santa Barbara, CA 93105  
 (805) 687-7143

CIRCLE 291 ON READER SERVICE CARD



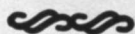
## Micro Management Systems, Inc.

2803 Thomasville Road East  
Cairo, Georgia 31728  
(912) 377-7120

Since 1978

- REPUTATION BACKED BY YEARS OF EXPERIENCE.
- PIONEER IN DIRECT TO CONSUMER SALES OF MICRO COMPUTERS AND ELECTRONICS
- MILLIONS OF DOLLARS IN SALES OVER THE YEARS
- TENS OF THOUSANDS OF CUSTOMERS
- HONEST
- RELIABLE
- LARGE INVENTORY
- NAME BRAND PRODUCTS

# DISCOUNT PRICES



# BUY DIRECT

It's simple. . .  
**CALL & SAVE MONEY**

**1-800-841-0860**  
CONVENIENT ORDER ENTRY

Co. & Info 912-377-7120

## COMPUTERS & EQUIPMENT

<b>EPSON PRINTERS</b> MX-80.....\$369 FX-80.....\$CALL MX-100.....\$CALL CALL - NEW PRODUCTS	<b>TRS-80 COMPUTERS</b> FROM Model 12.....\$2639 Model 16.....\$4012 MC-10.....\$99 Model IV.....\$CALL Portable.....\$CALL Color Computer \$CALL New Products..\$CALL	<b>OKIDATA PRINTERS</b> Complete line DISCOUNT PRICED FROM <b>\$339</b>
 <b>SMITH CORONA</b> <b>TP-1 DAISY WHEEL PRINTER</b> DISCOUNT PRICED FROM <b>\$499</b>	<b>WE CARRY THE COMPLETE LINE OF TRS-80 COMPUTERS</b>	<b>C. Itoh PRINTERS</b> FROM <b>\$397</b> <b>brother.</b> \$CALL
<b>TRS-80 PRINTERS</b> Complete line DISCOUNT PRICED FROM <b>\$199</b>	<b>Commodore COMPUTERS</b> FROM <b>\$139</b> VIC 20 COMPUTER COMMODORE 64 VIC 1541 DRIVE VIC 1525 PRINTER VIC 1530 DATASETTE VIC 1600 MODEM SOFTWARE \$CALL	<b>FRANKLIN</b> ACE 1000 ACE 1200 DISCOUNT PRICED FROM <b>\$898</b>
<b>stair PRINTERS</b> GEMINI-10 GEMINI-15 DISCOUNT PRICED FROM <b>\$339</b>	<b>FREE UPON REQUEST</b> • DISCOUNT PRICE LIST AND INFORMATION KIT • COPY OF MFR'S WARRANTY WRITE <b>MICRO MANAGEMENT SYSTEMS</b> TELEMARKET DEPT. NO. 3 2803 THOMASVILLE RD. E. • CAIRO, GA. 31728	<b>EAGLE COMPUTER</b> <b>Novation</b>  <b>Hayes</b> 

ALL PRODUCTS WE CARRY ARE BRAND NEW AND COVERED BY MANUFACTURER SPECIFIC WARRANTY PRICES AND PRODUCTS SUBJECT TO CHANGE WITHOUT NOTICE

FREE UPON REQUEST  
• DISCOUNT PRICE LIST AND INFORMATION KIT  
• COPY OF MFR'S WARRANTY  
WRITE

**MICRO MANAGEMENT SYSTEMS**

TELEMARKET DEPT. NO. 3  
2803 THOMASVILLE RD. E. • CAIRO, GA. 31728

# views...book

**Steve Gray, et al.**

**Silicon Valley Guy Handbook**, by Patty Bell and Doug Myrland. Avon Books, New York. 105 pages, paperback \$3.95. 1983.

Two things led us to believe this ought to be a good book: first, it is modelled after the *Preppie Handbook* (a funny book), and second, it is published by Avon who just did the enormously successful (and funny) *Items From Our Catalog*. We were wrong. *Silicon Valley Guy* is a total yawn from cover to cover. It doesn't have one single "heh, heh" item or "in" joke. As Gene Shalit once said, "The author has committed ho-humicide with his typewriter." Pass this one by. If you receive this book as a gift, the person who gave it to you is your enemy; give it back. Yawn... —DHA

**Some Common Basic Programs**: TRS-80 Level II Edition, by Lon Poole, Mary Borchers and Karl Koessel. Osborne/McGraw-Hill, Berkeley, CA. 202 pages, paperback \$12.99. 1981.

According to the title, these 76 programs, which will run on both the Model I and Model III TRS-80, are "common" ones. Well, perhaps if you work in the financial, statistical or mathematical field, these programs may be common to you. If not, you might never need any of them, other than perhaps some of the financial ones, and even those not all that often.

The 20 financial programs include Future Value on an Investment, Depreciation Rate, Term of a Loan, and Mortgage Amortization Table. Some of the 28 mathematical programs are Area of a Polygon, Coordinate Conversion, Integration by Simpson's Rule, and Matrix Inversion. Among the 17 statistical programs are Poisson Distribution, F-Distribution, Chi-Square Test, and Linear Regression. The remaining 11 programs are varied, such as Recipe Cost, Federal Withholding Taxes, Day of the Week, and Check Writer. (The programs were also originally offered on cassette, but this is no longer available.)

This book doesn't teach Basic programming, but you don't have to understand the language. Just copy the listings into your TRS-80 and run the programs as shown in the examples. (The book is also available in editions for the Atari, Pet/CBM, Apple and IBM PC.)

As usual with an Osborne book, this one is meticulously prepared. Each program includes a good sprinkling of explanatory REM lines, and is accompanied by a description, example, and sample run. Some include optional changes for altering the input or output of the original program. All require at least 4K, and are designed to fit a 64-column screen.

If you need enough of these programs to make the price attractive, this book presents them much better than nearly all other similar collections.

**80 Practical Time-Saving Programs for the TRS-80**, by Charles J. Carroll. TAB Books, Inc., Blue Ridge Summit, PA 17214. 251 pages, paperback \$9.95. 1982.

Once more, a collection of Basic programs; and once more, programs you may never need—unless you're a mathematician, CPA, statistician or electronics technician.

The 80 programs are divided into five groups: Numbers (polar to rectangular conversion, complex functions, numerical integration), Finance (future value, loan amount, sinking fund), Statistics (permutations, ungrouped data, exponential curve fit),

# reviews...book

Electronics (gamma match, matching networks, microstrip), Geometry (inverse hyperbolic functions, great-circle calculations). Three appendixes provide a summary of Basic statements and commands, powers of two, and hex/decimal integer conversion.

Each program is accompanied by a description of what it does, a listing, a sample run and, where appropriate, graphs or partial schematics. The writing is pedestrian but serviceable.

If you work in one of the areas addressed by these programs, you might find some use for this book. But by now you probably already have a couple that provide most or all the standard short programs you need in the five categories. At least eight similar books have been reviewed here since review #1 in the Nov/Dec 1978 issue.

**Problem-Solving Principles for Basic Programmers: Applied Logic, Psychology, and Grit**, by William E. Lewis. Hayden Book Co., Inc., Rochelle Park, NJ. 174 pages, paperback \$9.95. 1981.

This book, which also exists in Fortran, Pascal, and Interlingua (pseudo-coding language) versions, provides "not only a problem-solving background, but also alternative solution paths from which the reader may choose," according to the preface.

A six-page Chapter 1 introduces the basic building blocks of problem solving. Chapter 2, the book's longest (50 pages), provides nine independent "prescriptions" that apply to general problem solving, but which can help solve programming problems, such as "Reverse gears and work backwards," "Make sure there is a method to your madness," and "Step back and view the forest."

Thirteen advanced prescriptions are provided in Chapter 3, including "Extinguish fire with a brainstorm" and "A pound of analogy equals a ton of sweat." Chapter 4 concerns Solving Larger Problems, with approaches not provided in Chapters 2 and 3; the main theme is top-down programming. Chapter 5, on Debugging, applies many of the techniques discussed in previous chapters, and also provides 16 prescriptions, including "Determine if bug is consistent" and "Simulate with paper and pencil." A bibliography of 33 books (including Lewis's three similar works) concludes the text, which stems from a college course in structured programming.

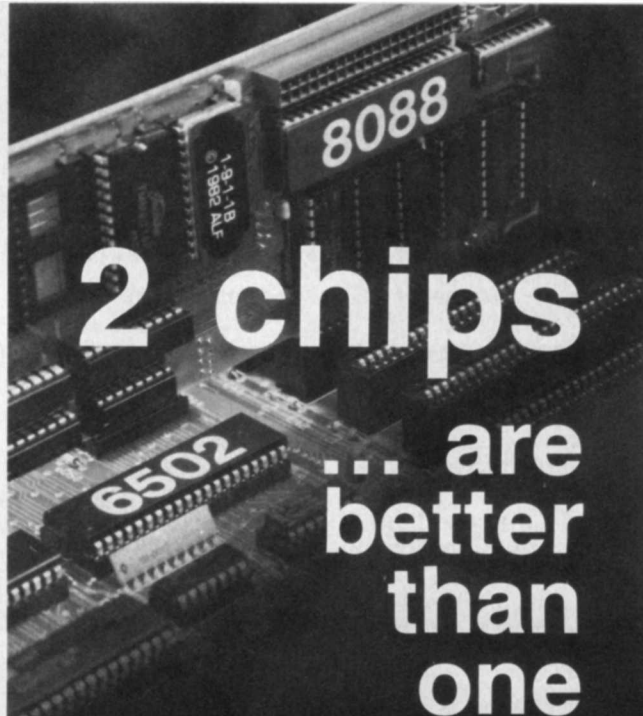
Each prescription is accompanied by one or more problems and at least one Basic program, all of which are described in enough detail to get across the basics of programming science. This book, written with a reasonable amount of detail and clarity, can be recommended to anyone having problems writing Basic programs; it may be the only one on the subject.

One curious feature is that the only attempt at humor in this otherwise quite serious text is in some of the prescription titles, such as "All eggs can be cracked" and "Beware of anxiety—it's heavy."

**Introduction to Microcomputing**, by Sydney B. Newell. Harper & Row, Publishers, New York. 627 pages, hardcover \$24.95. 1982.

This introductory text, which assumes no prior knowledge of computers, electronics or engineering, concentrates on the 6800 microprocessor "so that readers can gain in-depth working knowledge from a single concrete model," the back cover says.

Designed to be used as a first- or second-year college textbook,



Is your Apple's 6502 processor chip a little overworked lately? Have you been eyeing one of those new, 16-bit systems? But you don't want to give up all your Apple programs ...

Add the powerful 16-bit 8088 processor to your Apple with ALF's Processor Card. Let the 6502 and 8088 work together to tackle your toughest problems—like speeding up your Applesoft and Apple Pascal programs. With the Processor Card, you can use the CP/M™ 86 or MS-DOS™ operating system to run the latest 16-bit software, including many IBM PC programs.

64K or 128K of high-speed memory is available for ALF's Processor Card. Use the Processor Card with 128K as a fast disk emulator or to view sixteen hi-res images in under a second. Or run Basic, C, COBOL, or Pascal with 16-bit performance!

The ALF Processor Card is just \$395 (Applesoft speed-up software included). See your Apple dealer today, or contact ALF for more information.

Trademarks: "Apple": Apple Computer, "CP/M": Digital Research, "MS-DOS": Microsoft.

# ALF

ALF Products Inc.  
1315F Nelson St. Denver, CO 80215  
(303) 234-0871 Telex: 4991824

# Pick A Program. Any Program. At A Software City Store!

- Programs • Books • Magazines
- Peripherals • Disks • Accessories

## SOFTWARE ALWAYS DISCOUNTED!

Now you can browse through thousands of programs for your personal computer — at Software City, your program discount center. When you need software for business, education, entertainment, utility or home management, Software City has a program for you.

# Software City

- AL Birmingham - 7771 Eastwood Mall (205) 591-8314
- AZ Phoenix - coming soon
- Tucson - coming soon
- CT Orange - Loehmann's Plaza (203) 799-2119
- FL Sarasota - 7211 S. Tamiami Trail (813) 923-4040
- Tampa - 13727 N. Dale Mabry (813) 961-8081
- GA Atlanta - coming soon
- IA Davenport - coming soon
- IL Arlington Hts. - 2304 E. Rand Rd. (312) 259-4260
- MA West Springfield - 1313 Riverdale Rd. (413) 739-5101
- MI Southfield - 29080 Southfield Rd. (313) 559-6966
- NJ Bergenfield - 106 N. Washington Ave. (201) 387-8388
- Englishtown - Yorktowne Shopping Center
- Fair Lawn - 34-11 Broadway (201) 791-8793
- Fairview - 251 Broad Ave. (201) 943-9444
- Green Brook - 60 Rt. 22 West (201) 968-7780
- Midland Park - 85 Godwin Ave. (201) 447-9794
- Montvale - 147 Kinderkamack Rd. (201) 391-0931
- Pine Brook - 101 Rt. 46 East (201) 575-4574
- Princeton - 33 Witherspoon St. (609) 683-1644
- Red Bank - 80 Broad St. (201) 747-6490
- Summit - 5 Beechwood Rd. (201) 273-7904
- Teaneck - 161 Cedar Lane (201) 692-8298
- Linwood - Central Square (609) 927-3393
- Cherry Hill - coming soon
- NY Fairport - 134 Village Landing (716) 223-3723
- Forest Hills - 113-01 Queens Blvd. (212) 261-1141
- Manhattan - 665 Lex., bet. 55 & 56 Sts. (212) 832-0760
- Mt. Kisco - 187 Main St. (914) 666-6036
- North White Plains - 641 N. Broadway (914) 946-1800
- Pomona - Old Rt. 202
- Long Island - coming soon
- Staten Island - coming soon
- OH Columbus - 1959 East Rt. 161 (614) 888-6660
- PA Bethel Park - Village Square Mall (412) 854-1777
- Exton - 14 Marchwood Rd. (215) 524-1483
- Whitehall - 2802 MacArthur Rd. (215) 434-3060
- Pittsburgh - coming soon
- PR San Juan - 1340C F.D. Roosevelt Ave. (809) 781-9357
- VA Richmond - 9027 Quioccasin Rd. (804) 740-8400
- Fairfax - coming soon
- WA Spokane - 9405 E. Sprague (509) 926-0337
- Seattle - coming soon

**BUSINESS SOFTWARE:** Catalog at all stores or write to Software City, Attn: Corporate Software Dept.  
**RETAIL STORE FRANCHISES:** \$32-40,000 est. total invest. Offering by prospectus only. Direct inquiries to Software City, Attn: Franchise Dept.  
 SOFTWARE CITY • 1415 Queen Anne Road • Teaneck, NJ 07666.

CIRCLE 195 ON READER SERVICE CARD

# views...book re

or as a supplement to more advanced courses, or a self-teaching manual, or a quick reference for those familiar with the field, this book emphasizes applications over arithmetic. Many in-chapter worked examples reinforce each topic. Review questions are at the end of every chapter; later ones include suggestions for programming applications.

The 14 chapters cover an introduction, Number Codes, Non-numerical Computer Codes, Using the 6800's Instruction Set, Introducing the PIA, Aids to Program Writing (algorithms, flowcharts, assembler), Arithmetic Operations, Decisions, Loops, Tables and Lists, Subroutines, Interrupts, Serial I/O, and Introduction to System Configuration. Four appendixes provide the 6800 instruction set (86 pages), M6800 Cross Assembler Reference Manual (38 pages), answers to some of the exercises (the rest are in the Instructor's Manual), and Some Characteristics of the MC68000 16-Bit Microprocessor (52 pages). Over 30 percent of the book is appendixes; the text itself is only 399 pages long.

The writing is simple and straightforward, the coverage thorough, and the book well worth the reading for those who want a good introduction to microcomputers.

**The Origins of Digital Computers: Selected Papers**, edited by Brian Randell. Springer-Verlag, Berlin, Heidelberg, New York. Third edition: 596 pages, hardcover, \$29.50. 1982.

Part of the series, "Texts and Monographs in Computer Science," this book has been expanded since it was first published in 1974, both in text and annotated bibliography; the latter now consists of over 850 items.

The book starts with the Analytical Engine that Charles Babbage started to design in 1834, and ends with two papers presented at the inauguration of EDSAC in 1949. "The aim has been to cover each significant milestone on the route from Babbage to EDSAC," according to the preface.

After an introductory chapter, the 34 papers are divided, by type of machine, designer or manufacturer, into seven more chapters: Analytical Engines (mostly Babbage), Tabulating Machines (mostly Hollerith), Zuse and Schreyer, Aiken and IBM (ASCC, CPEC), Bell Telephone Laboratories (relay machines), The Advent of Electronic Computers (ENIAC, plus papers by Atanasoff, Bush, Rajchman, Mauchly, and others), and Stored Program Electronic Computers (EDVAC and EDSAC).

Other familiar names appear as authors of these papers, including Hopper, Eckert, Alt, Goldstine, von Neumann, Williams, and Wilkes. Some are not familiar, and a few represent pioneers whose work has been almost forgotten—or are almost unknown in this country—such as Couffignal, Dreyer, and Phillips.

When possible, the original papers have been used, such as Ludgate's 1909 paper on the Babbage machine, the two papers by Aiken with many photographs and drawings (from IEEE publications), the Goldstine paper on ENIAC, et al.

The book "is intended for readers, such as computer science students or people employed in the computer field, who are interested in the history of their subject, and particularly in the technical details of the precursors of the modern electronic computer," according to the preface to the second edition. The third edition is highly recommended to all such readers as the best book available on computer history, containing a great wealth of detailed papers, collected with diligence and edited with great care.

# Reviews...book

**6502 Assembly Language Subroutines**, by Lance A. Leventhal and Winthrop Saville. Osborne/McGraw-Hill, Berkeley, CA. 559 pages, paperback \$15.95. 1982.

The authors and the publisher apparently assume that if you don't know which computers use the 6502 microprocessor, you wouldn't be interested in this book, which doesn't reveal until page 54 that the 6502 is used in the Apple.

The first three chapters are tutorial, on General Programming Methods (with a quick summary for experienced programmers), Implementing Additional Instructions and Addressing Modes (how to add them), and Common Programming Errors. The 40-plus subroutines are contained in eight chapters, on Code Conversion, Array Manipulation and Indexing, Arithmetic, Bit Manipulation and Shifts, String Manipulation, Array Operations, Input/Output, and Interrupts. Three appendixes provide a summary of the 6502 instruction set, a programming reference for the 6522 interface adapter, and the ASCII character set. A 24-page glossary completes the book.

The book is as thorough as just about every Osborne publication, and just about as complex. Each subroutine is documented completely, including the purpose of the routine, procedure followed, registers used, execution time, program size, data memory required, special cases, entry and exit conditions, and examples.

Leventhal, already known for his clear, detailed writing about assembly language in several publications, adds another star to his crown with this excellent book, "aimed at the person who wants to use assembly language immediately, rather than just learn about it." This is not easy to read; the authors pack a great deal in each page, and a previous knowledge of assembler would help very much. If you have an Apple and want to know more than just Basic, to the extent you're willing to dig hard, buy this book.

**Practical Data Base Management**, edited by Auerbach Publishers Inc. Reston Publishing Co., A Prentice-Hall Co., Reston, VA. 444 pages, hardcover \$24.95. 1981.

Contributors to the "Auerbach Data Base Management Series" are the "authors" of this book, written "to provide an easy-to-read, organized guide to the practical issues of planning, designing, and implementing data-base-supported information systems," according to the preface.

The 23 chapters are divided into five parts: databases, database management systems, data dictionary/directory systems, database administration, and user system interfaces.

With its emphasis on the practical, the book examines areas such as management issues in planning ("A tendency exists to tackle problems that take a long time to correct."), the database management system ("The requirements for the DBMS are significantly different from those the vendors have supplied to date."), the impact of personal privacy requirements on database administration ("Individuals should be able to inspect the personal information maintained on them and correct it if it can be demonstrated to be in error."), and many more.

Although geared to managers responsible for the planning, design, implementation and maintenance of a database environment, this book, by omitting overly technical detail, and by being written clearly and concisely, offers much worthwhile information to anyone wanting to understand databases and how to manage them. □

ATARI ATARI ATARI ATARI

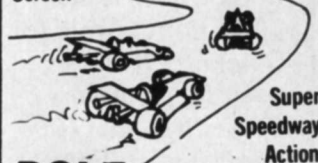
INTRODUCING...  
**Super Mailer +**  
From Royal Software  
"Capt. ZIP" New!  
48K DISK  
**\$49.95**

The Most User Friendly Mail Management program available! It even allows you to catalog your record, book or other collections... Limited only by your imagination!

Store 500-2000 files / disk—Fast, machine language sorts—Works on single or double-density format—Auto-deletes duplicates—Print disk directory—Official State abbreviations built in—Special coding feature—Re-label fields for unlimited use—Merge files—Create sub-files—Search files on any field—Print labels/File copy—More!

NEW!!! From Atari

Colorful,  
Scrolling  
Screen



**POLE POSITION**  
Super  
Speedway  
Action  
**\$44.90**  
Reg. \$49.95  
• 16K Cartridge

**FREE CATALOG**

► WITH ANY ORDER... OR SEND \$1.00  
(Refundable with Order)

★ **OVER 1000 items for your ATARI!**

Including product descriptions.

- EPSON • PERCOM
- BRODERBUND • APX
- ROKLAN • ON-LINE
- DATASOFT • ATARI®
- ADVENTURE INT'L
- SYNAPSE • VISICALC • Much More



★ **We handle only ATARI compatible hardware & software ... so we know what works best! CALL US FIRST!!!**

An interesting variation on the Climb & Jump game!  
From SYNAPSE  
**New!!!**

**Pharaoh's Curse**  
Multiple Screens  
Great Graphics  
Action-Adventure  
Multiple Players  
32K Tape, Disk  
**\$31.50** Reg. \$34.95

Protect Your Investment  
**DUST COVERS**

• Durable Brown Vinyl  
• 410 • 400 • 800 • 810  
Please Specify **\$8.95 ea.**

★ **Top-Ten Programs** ★

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| 1. Zaxxon<br>Disk, Tape \$35.10      | 6. Astro Chase<br>Disk, Tape \$26.90 |
| 2. Donkey Kong<br>Cart \$44.90       | 7. QIX<br>Cart \$39.50               |
| 3. Dig Dug<br>Cart \$39.50           | 8. Way Out<br>Disk \$31.50           |
| 4. Necromancer<br>Disk, Tape \$31.50 | 9. Monkey Wrench II<br>Cart \$54.00  |
| 5. Football<br>Disk, Tape \$28.90    | 10. Defender<br>Cart \$39.50         |

**CREDIT CARD ORDERS -**

**TOLL FREE 1-800-452-8013**

(ORDERS ONLY - For Information (503) 683-6620)

Shipping & Handling: UPS or PARCEL POST \$2.00

UPS Air (48 hr. Delivery!) \$3.90

• **Master Card**

• **American Express**

• **Visa**



**COMPUTER PALACE**  
Formerly  
Royal Software

2160 W. 11th Ave.  
Eugene, OR 97402  
(503) 683-6620

# 50 easy new games, graphics and business programs for your Timex Sinclair 1000

Now you can start getting more fun, more challenge and more practical value from your computer with the clearest, most comprehensive book ever written for the TS 1000, compatible for use with Sinclair ZX-81.

In *50 Programs for the Timex Sinclair 1000*, Leland B. Carter outlines exciting new ways to use your un-expanded Timex for games, graphics, math, physics, business, puzzles and more.

You'll find hours of sheer enjoyment. You'll instantly expand your software library. What's more, you'll permanently enhance your computer programming skills.

Step-by-step instructions in Sinclair Basic let you immediately type in and run programs like:

- Booby Trap
  - 2-D Reversal
  - Target Gallery
  - Flight Graphic
  - Stopwatch
  - Calendar
  - Calculator
  - Blast-Um
  - ESP
  - What's the Pattern
- And many, many more!

Each program has been thoroughly tested and re-tested for ease of entry. And you'll find the user-friendly statements extremely helpful in guiding your progress, and in suggesting further input.

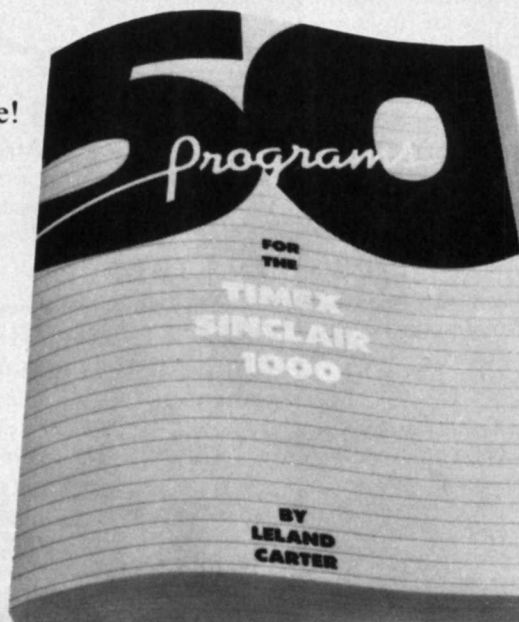
Plus you'll enjoy better-quality graphic and screen display than you've ever achieved on your TS 1000.

*50 Programs for the Timex Sinclair 1000* is truly the best software investment you can make right now. At just \$6.95, you're getting each program for less than 14 cents. Compare that to the price of pre-packaged programs!

Start getting more from your computer by ordering your copy of *50 Programs for the Timex Sinclair 1000* today!

**Compatible for use with  
Sinclair ZX81**

**For faster service,  
PHONE TOLL FREE  
800-631-8112  
(In NJ only: 201-540-0445)**



MAIL TODAY TO:

**CREATIVE COMPUTING PRESS**  
Dept. HC8F 39 East Hanover Avenue  
Morris Plains, NJ 07950

Please send me \_\_\_\_\_ copies of *50 Programs for Timex Sinclair 1000* for only \$6.95 each, plus \$1.50 shipping & handling per book.

Total Amount \$ \_\_\_\_\_

☐ Payment Enclosed. (CA, NJ and NY State residents please add applicable sales tax.)

Name \_\_\_\_\_  
(please print)

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

\*Outside U.S., add \$3 for shipping and handling.

☐ Check here to receive a FREE catalog of computing books, magazines and guides.

Also available in your local bookstore or computer store.

# creative computing CLASSIFIED

**CLASSIFIED RATES:** Per Word, 15 Word Minimum. **REGULAR: \$2.85. EXPAND-AD®: \$4.88.** Ads set in all bold type at 20% premium. Ads set with background screen @ 25% premium. **GENERAL INFORMATION:** Prepayment discounts available. Payment must accompany order except credit card—Am. Ex., Diners, MC, VISA (include exp. date)—or accredited ad agency insertions. Copy subject to publisher's approval; must be type-written or printed. First word set in caps. Advertisers using P.O. Boxes MUST supply permanent address and telephone number. Orders not acknowledged. They will appear in next available issue after receipt. Closing date: 5th of the 3rd month preceding cover date (e.g., April issue closes Jan. 5th). Send order & remittance to: Classified Advertising, **CREATIVE COMPUTING Magazine**, 1 Park Avenue, New York, N.Y. 10016. Direct inquiries to: Kenneth L. Novotny (212) 725-3927.

## SOFTWARE

**FREE SOFTWARE DIRECTORY.** Database manager, mailing list, inventory, accounting, payroll. TRS-80, xerox, IBM-PC. Long SASE. 376. Micro Architect, 96 Dothan, Arlington, MA 02174. 617-643-4713.

**VIC-20 TRS 80 SOFTWARE, HARDWARE**—Morse code, RTTY, EPROM, programmer memory. FRANK LYMAN, P.O. Box 3091, Nashua, NH 03061.

**OPTION-INVESTING PROGRAM MAXIMIZES PROFIT.** For Apple, TRS-80, IBM, \$125. Free Brochure. OPTIONS-80, Box 471-C, Concord, MA 01742.

**OSBORNE™ GRAPHICS**—Create graphics images, movies. Features: graphics—and text, half-intensity, block move, underlining, automatic program generation. 55 page manual, shipping. \$29.95. MC, Visa, (813) 681-0194. SuperGraphics from RUFF SOFTWARE, Box 98, Plant City, FL 33566.

**SELECT SOFTWARE** and books at discount. Atari-TRS-80-TI-VIC-more. Send \$1.00 and computer type for list. Selective Marketing, Box 296, Freeport, IL 61032.

**DISCOUNT SOFTWARE**—Available for Apple, TRS-80, IBM-PC, and TI 99/4 Personal Computers. Professional applications for the doctor, dentist, attorney, school administrator, teacher, contractor and general office personnel. Catalog \$1.00. Write for **MONTHLY SPECIAL OFFERS!** Creative Discount Software, 256 S. Robertson Blvd., Suite 2156, Beverly Hills, CA 90211.

**TI 99/4A MOON TRIP** animated graphic program on cassette. Guide module through asteroid belt. Then land on moon. Speech synthesizer and joystick capability. \$12.00 postpaid. JAG Software, P.O. Box 2225, Dept. CC, Ocean, NJ 07712.

**VIC-20 OWNERS**—FREE animated catalog cassette. \$1 postage/handling: M. Pascall Software, Box 1143-C, Santee, CA 92071.

**TI PROGRAMS on cassette.** Large selection and variety, over 700. 4 sample programs and catalog \$3.00, KS SOFTWARE, Box 27130, Cincinnati, OH 45227.

**STOCK PORTFOLIO Software.** Apple, IBM PC. Includes Portfolio maintenance, inquiry, graphs and reports. MICRO-LOGIC DATA SYSTEMS, Box 37351, Omaha, NE 68137.

**VERY INEXPENSIVE Apple Educational and Recreational programs.** VOCKELL SOFTWARE, Dept. C, 6927 Knickerbocker, Hammond, IN 46323.

**TI-99/4A OWNERS.** Send for free list of new and exciting, low cost software. Dynamo, Box 124, Hicksville, NY 11801.

**TURN YOUR TV SET INTO AN IFR FLIGHT SIMULATOR** using your Apple II and this program. \$50.00 at your computer store or order direct from **PROGRAMMERS SOFTWARE, Box 199, Cabot, AR 72023. (501) 843-2988.**

**WORD PROCESSOR!** Guess the price: upper/lower case, word wrap, search/replace, preview printed version, page numbering, right justification, block text movement, file linking, alternative (non-QWERTY) keyboards. \$200.00? **WRONG!** The Cheapsuit Word Processor is \$30.00. Apple II 48K, DOS 3.3 Not copy-protected! Cheapsuit Software, Dept. CC-1, Box 923, Iowa City, IA 52244.

**ATARI, APPLE, IBM-PC: Extensive line-educational, entertainment, business. FREE BROCHURE.** New Dimension Software, 39010 Baroque, Mt. Clemens, MI 48044.

**VIC-20/COMMODORE-64 Educational Software** designed by teachers. Free catalog. ATHENA SOFTWARE, 727 Swarthmore, Newark, DE 19711.

**GUARANTEED LOWEST SOFTWARE PRICES FOR ALL SYSTEMS!** Write for quotes and **FREE CATALOG.** Specify systems. N.Y.S.E., P.O. Box 722, Newtown, PA 18940.

**6800/6809/COLOR COMPUTER SOFTWARE** including compatible single-user, multi-user and network operating systems, compilers, accounting and word processing packages. Free catalog. SOFTWARE DYNAMICS, 2111 W. Crescent, Suite G, Anaheim, CA 92801. (714) 635-4760.

**FIN PAK I: Amortization and Accumulated Depreciation Software.** Available on APPLE, ATARI, TI and TRS-80. Includes hard copy feature. \$39.95 check, m.o. Send for **FREE BROCHURE.** MICROAGE ASSOC., 21211 N.E. 2nd Avenue, Miami, FL 33179.

**FREE money saving bulletin** on popular brand name programs and books for your small computer. Superior, Dept. CR, 8030 Westchester Road, Westchester, OH 45069.

**EXCHANGE TI-99/4A cassette programs** you've created with others. Also, 8-10 GREAT cassette programs only \$5. "THE EXCHANGE", CC-2, P.O. Box 46, Sterling, VA 22170.

**THE BEST OF PUBLIC DOMAIN CP/M SOFTWARE!** Utility Programs, Processor of Words, Catalog Disks, MUCH MORE! Includes Complete User's Manual. 8" SS/DD only \$28.95 or send for FREE information. UNITECH, BOX 98, MANCHESTER, NY 14504.

**\$\$\$ SOFTWARE SAVINGS,** over 2000 programs from 150+ publishers. Send for **FREE DETAILS.** Soft-Source, 2464 El Camino Real, Dept. 236B, Santa Clara, CA 95051.

**C64 (5) programs \$9.95. C10 tapes, (25) \$16.00 (100) \$56.00.** Boxes add 25%. NY taxable. MC/VISA add 4%. Fabtronics, 51C Quarry, Brockport, NY 14420.

**APPLE II, CIVIL ARCHITECTURE** design software. Hydraulics, hydrology, earthwork, beam design, structural. Newly available vertical curve AASHTO criteria and flood routing. Brochure available. CIVIL-WARE, 3112 Duffield Avenue, Loveland, CO 80537. (303) 669-0830.

**LEASE YOUR BUSINESS SOFTWARE.** Why invest unless you're sure? Rent business software for Apple II, IBM/PC, TI-Professional, or 8-in. CP/M Systems. No risk. Full rental credit if you do buy. Get details and rental list: Dept. C-7, Micro-Mart, 1131 Central, Wilmette, IL 60091. 1-800-323-8064, (312) 251-5699.

**SUPER LOW PRICES** on high quality software. **FREE Brochure.** Dakota Data, 608 Columbia Road, Grand Forks, ND 58201.

**VIC-20 OWNERS!** "Robbie"—Robot Simulator Program. Fun & Educational. For details Send SASE: RSVP Software, 384 Lakeview Drive, Wyckoff, NJ 07481.

**TRS-80 SOFTWARE CATALOG** Models 1/3/4 includes \$2.00 coupon, send \$1.00. Practical Programs, 1104 Aspen, Toms River, NJ 08753.

**TI 99/4A SOFTWARE.** Free price list plus newsletter. Glen Dobbs, Box 801CC-1, Santa Maria, CA 93456.

**FREE CATALOG.** Small business, home management, educational software for VIC-20/64. ECP, Box 88, Little Neck, NY 11363.

**SOFTWARE: ATARI, APPLE, COMMODORE, IBM/PC, Timex.** Competitive Prices. Free Catalog. 1-Stop Software Stores, P.O. Box 21828, Denver, CO 80221. (303) 431-6598.

**TI-99/4A PROGRAMMERS: Affordable Software! Catalog, only \$1. PROGRAMS SOFTWARE, 1435 Burnley Square North, Columbus, OH 43229.**

**FRENCH and MULTI-LINGUAL Software** for the Apple II+ or IIE. **FREE CATALOG.** LE PROFESSEUR, P.O. Box 301C, Swanton, VT 05488. (514) 747-9130.

**ATTENTION: TI 99/4A; SINCLAIR TS/1000; COMMODORE VIC-20/64; APPLE END USERS!** Super Software Selection. Send \$1.00 for CATALOGUE. State make, model. Alpha Software, 162 Chapel Drive, Churchville, PA 18966.

## HARDWARE

**NEW EPSON FX-80 Printer \$545. Gemini-10 Printer \$360.** All orders sent COD. Team Computer. (203) 288-5772. P.O. Box 6034, Hamden, CT 06517.

**NEC and OKIDATA PRINTERS, AMDEK MONITORS.** Free Price List. Lowest Prices! Tech-Systems, P.O. Box 565, Spring, TX 77383.

## COMPUTER EQUIPMENT/SUPPLIES

**EPROM ERASER \$49.95.** Erases all UV Eeproms, 90 day warranty, send orders to LOGICAL DEVICES INC., 781 W. Oakland Blvd., Ft. Lauderdale, Florida 33311, (305) 776-5870.

**SUPPLIES! SUPPLIES! SUPPLIES! Diskettes, Ribbons, Computer Paper, ETC.—at VERY competitive prices. FREE DELIVERY IN NYC (COD Outside). BOOT-UP—(212) 686-8141.**

**WANT A PLEASANT SURPRISE?** Call or write for quotes: Atari, Commodore, Timex, T.I., Corona (IBM work-alike), Amdek, Anadex, Apple & IBM accessories. Hayes, More. **GET SURPRISED! HARDWARE SOFTWARE ANYWARE CO.,** 10 Coles Street, Brooklyn, NY 11231-(212) 596-3592.

**DOUBLE DENSITY DISKETTES—10/\$18.** BASF Cassettes-10/\$7. Prowriter \$400, Micro-Sci, Rana, 4th Dimension Drives from \$270. Complete Computers, 737 Empire Ave., Far Rockaway, NY 11691. (212) 471-2436.

**COMPUTER PAPER—SAVE \$\$\$—Top quality.** Low single-carton prices. Free shipping via UPS. Call A-1, (800) 628-8736 or (213) 804-1270.

**LOWEST PRICES** on Computer Supplies and Accessories: WABASH SS/SD, 10/\$17.75, \$2. shipping. Price List. Computer Accessories Unlimited, P.O. Box 189, Elmont, NY 11003.

**PROTECT YOUR COMPUTER!** Dust damages microcircuits, our software dust covers can save your systems. Free brochure. Pro-Tech Computer Products, P.O. Box 30263, Portland, OR 97230.

**SAVE—7% off any advertised price—Audio—Video—(3% tapes & Computer Equipment).** Free shipping. Fully guaranteed. Include add w/prices circled, check, MO (min 50% of order, balance COD): Direct Discount Brokers, 1105 Ferry Avenue, Niagara Falls, NY 14303.

**NEW! COLOR YOUR COMPUTER'S SCREEN!** Videoflex Color Kit boosts fun and efficiency. Free details. Write Videoflex-4B, Box 149, Netcong, NJ 07857.

**OFFICE AND HOME COMPUTER ACCESSORIES Wanted:** Importers for beautiful Teak Wood Computer Accessories: Disk Holders, Disk Storage Drawers, Stands and Desk Accessories. Contact Asian Pacific Resources, P.O. Box 11-85, Bangkok 11, Thailand.

## COMPUTER PUBLICATIONS

**\$2 FOR TS 10000, ZX81 string search listing and catalog** from PEAK, P.O. Box 8005, Suite 231, Boulder, CO 80306-8005.

**DISCOUNT COMPUTER BOOKS.** Over 80 best selling computer books available at discount prices. Send for free brochure. Computer Books, Box 286, Lompoc, CA 93438.

**MAKE MONEY NOW** with microcomputer and related products! The best monthly newsletter tells how. Let us help you plan, start, grow! How, Box 218, Washington, IL 61571.

**NEW GUIDE:** How I make a comfortable living using my micro computer—\$3.50 p.p. Embee Press, PineGrove, Kingston, NY 12401.

**TRS-80 MODEL 3 USERS!** Make TRSDOS 1.3 work faster, better with Patch-Sheet #1. \$2.95 postpaid. The Software Factory, 12101 Western View, Oklahoma City, OK 73132.

**1983 SOFTWARE MARKETING & DEVELOPER'S SOURCE MANUAL.** \$19.95 postpaid. This is an indispensable aid for those who develop and/or market, or plan to market computer software. Source information on copywriting, licensing, cassette and disk purchasing/duplication, copy protection, packaging, bulk mailing, software author's markets, and more. CELESTIAL SOFTWARE, 3010 Warrington, Lakeland, FL 33803. (813) 686-3311.

**SOFTWARE REVIEW.** We give you the information you need to spend your software dollars wisely. Software Review is a bimonthly newsletter with candid, timely reviews and articles on software for Apple, Vic-20, Commodore 64, Atari and Timex. Charter subscription rate \$11.97 for one year. Send check or money order to Software Review, Box 503, Brattleboro, VT 05301.

**GUIDE TO MAIL ORDER BUYING**—Discounts on Hardware/Software Peripherals/Supplies. Low-cost directories tell you where. New report "How to Buy" free with purchase. For FREE details: CAVERLY'S INC., Dept. C-7, 512 Bridle Court, Walnut Creek, CA 94596.

## COMPUTER CLUB

**JOIN THE BIG RED APPLE CLUB**, a national Apple user's group with benefits including monthly newsletter and large library of free software. Annual membership \$12. Sample newsletter \$1. **BIG RED APPLE CLUB**, 1301 N. 19th, Norfolk, NE 68701 (402) 379-3531.

**VIC CLUB:** Swap programs for \$1 postage. Send cassette or disk to VIC CLUB, P.O. Box 225, 291 Huntington Ave., Boston, MA 02115.

**PROGRAMMER WANTS TO RAP** and swap TI99/4A Timex and others. R.C. Rhodes, 7945 Mitchell, Beaumont, TX 77706.

## FOR SALE/BARTER

**DIAMOND NEEDLES and STEREO CARTRIDGES AT DISCOUNT PRICES** for SHURE, PICKERING, STANTON, EMPIRE, GRADO, AUDIO TECHNICA, ORTOFON, ADC, SONUS, MICRO-ACOUSTICS AND LAST. Send S.A.S.E., free catalog. **LYLE CARTRIDGES**, Dept. C, Box 69, Brooklyn, NY 11218. For fast COD service TOLL FREE 1-800-221-0906. NY state (212) 871-3303. 9AM-8PM except Sunday.

**ELECTRONIC PARTS, EQUIPMENT.** Low Prices, Free catalog. **OPAL EAST CO.**, Box 0-38, 323 Franklin Bldg. S., Suite 804, Chicago, IL 60606.

## BUSINESS OPPORTUNITIES

**MAILORDER OPPORTUNITY!** Start profitable home business without experience or capital. Information free. **MAIL ORDER ASSOCIATES**, Dept. 763, Montvale, NJ 07645.

**COMPUTER CASH**—101 exciting, new, sparetime home businesses. Report, \$4.50. Associated Research, Box 22485, Houston, TX 77227.

**MAKING MONEY WITH PERSONAL COMPUTERS!** Book only \$5.95. Book AND Tapes \$25.00. Computer Resources, 1659 Mills Street, Chula Vista, CA 92010.

**COMPUTE PROFITS \$\$\$** Create Computer Video Games. Sell through mailorder. Guaranteed. Rush \$12.95 for complete guide and sample games. **TY Enterprises, Inc.**, P.O. Box 35421, Detroit, MI 48235.

**MLM OF HOME COMPUTERS SOFTWARE** (Apple, Vic, TI, TRS-80, IBM-PC) Discount Prices. Minimal investment. **CWMOA**, 164 Colorado Ave., Montrose, CO 81401. (303) 249-9324.

**EARN CASH** with your computer! Great money-making ideas. Detailed instructions, getting started, successful marketing, much more. New career, wealth probable. Send \$5.00. **ELAN**, Box 803, Menomonee Falls, WI 53051.

## BUSINESS SERVICES

**COMPUTER/INVESTOR USERS GROUP.** Application for stocks, bonds, commodities. Write/Phone for details (add \$15 for newsletter if desired). Dept. J, 36 Highland, Metuchen, NJ 08840. (201) 494-1200.

## GAMES

**IBM GAMES!!** Compu-Vegas Line: Black Jack, Craps, Slots, Roulette. \$4.95 each; all 4, \$15.95. **Compu-Soft**, 1928 S. Siegel, Springfield, MO 65804.

**WASTELAND ESTATE**—An all new text adventure. Defeat the magic and free the town. 48K Disk Applesoft \$23.99. CA Residents add 6.5% tax. **Evergreen Software**, 1409 Mt. Diablo #201, San Jose, CA 95127.

**VIC-20 ADVENTURE GAMES.** Prices from \$8. Send for free catalog. **James**, 6124 Vega, Fort Worth, TX 76114.

**TI-99/4A Cassette Games.** Two exciting programs and list, \$5.00. **TI-Games**, 4129 Abercorn Road, Knoxville, TN 37921.

**"ESCAPE", "SLOTS"—CASSETTE.** Fantastic Games—Commodore 64k, Pet. \$8.00—Bill, 3 Parkway Dr. So., Orangeburg, NY 10962.

**MOONBASE GAME** for TI-99/4A. For cassette and catalog, \$3.00. **Rebel Soft**, P.O. Box 9543, VRS, Beaumont, TX 77709.

## IBM PC PRODUCTS

**BANNER PROGRAM PRINTS** banners and signs (3" high letters) on your IBM PC. \$32.95. **SW & A**, Box 37085, Houston, TX 77237.

**STARTREK—THE GAME.** An old classic. 64K, 80 column monitor. \$24. **Richard Waikel**, 743 Walnut, Ft. Wayne, IN 46804.

## TIMEX/SINCLAIR

**FREE CATALOG:** games, business, science, household software, also hardware. **JPR Software**, P.O. Box 4155, Dept.-C, Winter Park, FL 32793.

**KROK, STAR SEARCH, NOAH'S ARK**, finest programs available. Machine language action, graphics. **SASE Brown Cottage**, 5486 Bright Hawk, Columbia, MD 21045.

**"MUST-HAVE" UTILITY SOFTWARE.** Cassettes—relocatable machine language. **SASE** for information **SIRIUS WARE**, 6 Turning Mill Rd., Lexington, MA 02173.

**TS/1000-ZX 801 SOFTWARE:** Scientific/Games/Custom—Send \$25 to Scientific Technologies, 21819 Ideal Avenue, Forest Lake, MN 55025.

**TIMEX/SINCLAIR-ZX81 SOFTWARE:** Scientific/Games/Custom—Send 25¢ for catalog to: Scientific Technologies, 21819 Ideal Avenue, N. Forest Lake, MN 55025.

## INSTRUCTION

**UNIVERSITY DEGREES BY MAIL!** Bachelors, Masters, Ph.D.s... Free revealing details. **Counseling**, Box 389-CE8, Tustin, CA 92680.

## COMPUTER INSTRUCTION

**PC-1 OWNERS!** Learn machine language fundamentals. Includes a machine monitor, editor, assembler, and binary calculator with tutorial/manual...\$30 ppd. Also have Program catalog utility...\$25 ppd, and the Pocket Banner for vertical/horizontal messages...\$10 ppd. **Structured MicroSyst**, 3402 Fernandina Road, Columbia, SC 29210.

## COMPUTER FORMS

**CONTINUOUS FORMS IN SMALL QUANTITIES.** Immediate delivery. "Starter Kit" includes: 500 clean edge letterhead, 500 continuous labels, 500 continuous 3 x 5 index cards, only \$24.00. **MicroFormat**, 1271 W. Dundee, Buffalo Grove, IL 60090.

## COMPUTER SHOWS

**'83 TEXAS COMPUTER SHOW:** Exhibitors Wanted, Show Date: July 27-30th—Brownsville; Oct. 27-29th, McAllen. Contact: (512) 682-7477.

**NEW JERSEY MICROCOMPUTER SHOW AND FLEA-MARKET.** Oct. 15-16, Meadowlands Hilton—new location. For information (201) 297-2526.

## COMMODORE 64

**ARCADE ACTION—MOVIE THRILLS—"Lightcycles"**, futuristic motorcycle chase—fast machine language for Commodore 64 on Disk or cassette. Send \$15.95 to **UNICORN Box 7L**, Grays Summit, MO 63039.

**COMMODORE 64—Cassettes:** Mazeman, Blackjack, Backgammon, \$9.00 each, three/\$22.00. **Adventure Games and Mortgage Package** available. **FREE BROCHURE:** Designacom, 5122 Lakeshore, Burlington, Ontario, Canadian inquiries. (416) 632-7911. US Inquiries.

**VIC 20 FIVE SLOT EXPANSION Motherboard Kit-Check/** money order—\$34.95 plus \$1.50 shipping. **Ferris Associates**, P.O. Box 68421, Indianapolis, IN 46268.

## MAILING LISTS

**MAILING LISTS of over 250,000 microcomputer owners for rent.** By machine: Apple, IBM, TRS-80, etc. Plus stores, clubs and much more. Write for catalog or call. **Irv Brechner**, Box 453, Livingston, NJ 07039. (201) 731-4382.

**COMPUTER SHOW ATTENDEES N.Y., N.J.:** 15,000 names. \$30/M. P/S labels. For info, (201) 297-2526.

## PROGRAMS

**TI-99/4A BUSINESS PROGRAM.** Provides main index of 6 programs. Specify TI-Basic, or printer version. Cassette Based full use instructions easy to use. 7 mins. per day input needed. Fully guaranteed, \$150.00. No CODs. Send check or money order to **Electronics Lab C14**, Box 7, Hudson, NC 28528.

**IBM-PC, FAST Cross-reference** program to **BASICA** with listings of SUBROUTINES, VARIABLES, FUNCTIONS, and KEYWORDS including FORMATTED program listing. **US \$28.00.** **SIS, Inc.** P.O. Box 301, Unionville, Ontario, Canada L3R2V3. (416) 224-2694. U.S. Inquiries.

## SERVICES

**LOST AND FOUND.** National Service. Computer Security Products. Save Now, Call (804) 424-5800. **Finders**, Box 2500-CR, Chesapeake, VA 23320.

**CUSTOM PROGRAMMING** for your Apple, Apple-compatible. Reasonable rates. Write: **Custom Programming**, P.O. Box 8685, Portland, OR 97207.

## USERS GROUPS

**VIC-20 USERS GROUP**, receive newsletter, programs, discounts and more. Send **SASE** for information. **P.O. Box 459**, Dept. 8, Ladson, South Carolina 29456.

**FREE SOFTWARE. DOCTORS, DENTISTS, VETS.** M.A.S.H.—Medical Applications Software Hardware. "MicroMed/MicroDent" 6389 Colby Way, Virginia Beach, VA 23464. (804) 424-5800.

## MISCELLANEOUS

**BETTER THAN GAMES**—with computer access (or without), meet friends everywhere for hobbies, sports, vacations, business ventures...Write **Electronic Exchange**, Box 68C21, Manhattan Beach, CA 90266.

CLASSIFIED ADVERTISING ORDER FORM				
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15 (MINIMUM)
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

Please refer to heading on first page of this section for ad placement information.

**REGULAR: \$2.85. EXPAND-AD®: \$4.88.**

# OF WORDS \_\_\_\_\_ # OF INSERTIONS \_\_\_\_\_

☐ PAYMENT ENCLOSED \$ \_\_\_\_\_

☐ CHARGE: You will be billed monthly. ☐ American Express ☐ Diners ☐ Visa ☐ MasterCard-Interbank # \_\_\_\_\_

Account # \_\_\_\_\_ Exp. Date \_\_\_\_\_

SIGNATURE \_\_\_\_\_

PRINT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CC-883

# creative computing's RETAIL ROSTER

A DIRECTORY OF STORES AND THE PRODUCTS THEY CARRY  
TO PLACE A LISTING CALL COLLECT: LOIS PRICE (212) 725-4215

## ALABAMA

VILLAGE COMPUTERS, 1720 28th Avenue South, Homewood, 35209. (205) 870-8943. Apple, Vector, Graphics, Peripherals, Software, Training and Service.

## ALASKA

JUNEAU ELECTRONICS—1000 Harbor Way, 99801. (907) 586-2260. Apple, Osborne Hardware/Software/Peripherals. Full Service and Support.

## ARKANSAS

GAME SHOP — Ft. Smith 72902. Computer Software for personal computers. 7 days/week.

## CALIFORNIA

D.E.S. DATA EQUIPMENT SUPPLY—8315 Firestone, Downey 90241. (213) 923-9361. VICVILLE: (714) 778-5455. Commodore PET, Commodore-64, Vic-20 specialists. Latest software, Hardware, Books, Supplies, Peripherals in stock.

BEST COMPUTER STORES, INC. 1122 B Street, Hayward 94541. (415) 537-2983. Apple, Compupro, Gimix, Osborne, Otrona, Panasonic.

BYTE SHOP OF HAYWARD, 1122 B Street, Hayward 94541. (415) 537-2983. Apple, Compupro, Gimix, Osborne, Otrona, Panasonic.

VANGUARD DATA SYSTEMS, 8696 South Atlantic Avenue, South Gate, 90280, 213-564-6402, Mon-Sat. North Star, Televideo, CPM Software.

COMPUTER CHAMP, 1200 South Sunset Avenue, West Covina, 91720, (213) 960-9844. Franklin Ace 1000, DTC printers, software, peripherals and supplies.

VALLEJO—COMPUTER IDEAS, 1029 Tennessee St., (707) 552-5076. Commodore, Epson, Sanyo. Software/Peripherals. Full Service/Support.

**CAMPBELL—DATA BANK, 394 E. Campbell, (408) 370-0199. 1000+ Apple Software, 300+ Atari Software, 300+ VIC Software, plus NEC, TRS, PC, and more. Discount prices—Expert knowledge.**

STOCKTON—STOCKTON COMPUTER, 4555 N. Pershing, (209) 952-2028. Apple, Franklin, Software/Peripherals. Discount prices with full service and training!

GLENDALE—COMPUTER PALACE, 1029 E. Broadway, (213) 241-2551. Hardware/Software/Peripherals/Service. Business/Home—Best Prices!

COMPUSALES—16819 South Hawthorne Boulevard, Lawndale 90260, (213) 370-3224. IBM, Victor 9000, Basis 108, Osborne, NEC, Apple.

AUBURN-AMERICAN MICROTREL, 884 Lincoln Way, Suite 32B, 95603. (916) 885-1172. Apple/Franklin, Atari, Commodore, Corona, IBM. Software, Hardware, Peripherals, Books/Magazines. Classes. Research. Personalized consultations for systems tailoring. Atari Service, Factory Authorized Network.

DALY CITY—LOTUS CENTURY, 287 Lake Merced Blvd., (415) 992-5230. All major computer lines at discount prices!

P.C. COMPUTERS—10166 San Pablo Ave., El Cerrito, CA 94530. (415) 527-6044. Commodore Specialists! Epson Computers! Pied Piper! Call or Write today. Excellent Prices!

SACRAMENTO—COMPUTERTIME, 8040 Greenback, Citrus Heights, 95610. (916) 969-4111. Large selection Educational/Game Software! Peripherals/Furniture/Accessories/Books.

**MOUNTAIN VIEW—COMPUTER MARKET, (415) 969-3097. Call us for the best prices around! Retail and Wholesale.**

## COLORADO

**ALPHA CENTER—12351 W. 64th, ARVADA 80004. (303) 421-6361. Atari, TI, Kaypro, Epson. Huge Software Selection! Repairs/Training.**

## CONNECTICUT

EAST HARTFORD—COMPUTERIFICS, 358 Burnside Ave., 06108. (203) 528-9819. Atari, Epson, IBM, NEC, Okidata, Panasonic, Vector. Sales and Consulting.

THE COMPUTER ESTABLISHMENT—210 Main St., OLD SAYBROOK. (203) 388-1271. Epson, NCR Decision Mate V, Televideo, Qume, Brother. Full professional support/Training.

## DELAWARE

COMPUTERLAND, ASTRO SHOPPING CENTER, Newark 19711. (302) 738-9656. Authorized Sales/Service—IBM, Apple, Osborne, Software, Peripherals, Training.

## FLORIDA

COMPUTER SYSTEM RESOURCES, INC., GAINESVILLE—Butler Plaza 32601. (904) 376-4276. Apple, Osborne, Atari, Software, Peripherals, Classes, Service.

GRICE ELECTRONICS, Fort Walton, Panama City, Pensacola 32501. 800-342-4646. (800-874-8398). Apple, Hewlett-Packard, 24 Hour Service.

APPLE AND SANYO at fantastic savings. Service, support, discount prices. Southern Micro Computer, 15945 NW 57th Avenue, Miami Lakes, FL 33014, (305) 621-4137. Serving south Florida for over 5 years.

FLORIDA BOOK STORE COMPUTER CENTER—1614 West University Ave., Gainesville, 32604. (904) 376-5606. Commodore, Hewlett-Packard Computers: Software and Accessories.

FAMILY COMPUTERS—4047 Bee Ridge Rd., SARASOTA 33582. (813) 921-7510. TDP-100 micro, SV-318 Computer. Peripherals/Software/Books.

**ORLANDO—SOFTWARE UNLIMITED, 3216 East Colonial Drive 32803. (305) 894-3304. Programs, Printers, Supplies for micro-computers. Discount Prices!**

TAMPA—MICRO COMPUTER SYSTEMS, 144 South Dale Mabry Highway, 33609. (813) 875-0406. Authorized Level 1 Apple Dealer.

FORT LAUDERDALE—THE SOFTWARE CONNECTION, 5460 N. State Road 7, 33319. (305) 484-7547. Discounted software/peripherals for TRS-80.

HOLLYWOOD—COMPUTERS 101, 101 Hollywood Fashion Center, (305) 981-1011. Franklin, KayPro, Gemini Printers, DTC Daisy Wheel Printers, ATARI, Etc.

## GEORGIA

MENTOR TECHNOLOGY, 3957 Pleasantdale Road, Atlanta, 30340, 404-447-6236. Franklin, Atari, Televideo, Sanyo, Altos, C. ITOH Printers Software. CP/M, Apple, IBM.

## ILLINOIS

VIDEO ETC., 465 Lake Cook Plaza, DEERFIELD, 60015, (312) 498-9669. Other locations: SKOKIE (312) 675-3655, ORLAND PARK (312) 460-8980, BUFFALO GROVE, (312) 459-6677, strong Hard/Software support for Apple, Atari, Kay Pro, IBM-PC

LOMBARD—COMPLETE COMPUTING—890 E. Roosevelt, (312) 620-0808: Apple, Atari, NEC, Altos, Dynabyte; Software, Peripherals, Classes.

FARNSWORTH COMPUTER CENTER—1891 N. Farnsworth Ave., Aurora 60505, (312) 851-3888 and 383 E. North Ave., Villa Park 60181, (312) 833-7100. Mon.-Fri. 10-8, Sat. 10-5. Apple, Fortune, Hewlett-Packard Series 80 Systems, HP Calculators, IDS Prism, SMC, Daisy Writer Printers.

COMPUTERS ETC., 2515 West 147th Place, Posen 60469, (South suburbs of Chicago). Apple, Zenith Hardware/Software/Service. Complete learning center.

DIGITAL WORLD—ADDISON, 711 Army Trail Rd., 60101, (312) 628-9222. Atari, Commodore, Franklin, NEC, Xerox, Zenith and more. Books/Magazines. Full Service and Training.

COMPUTERLAND/NORTHBROOK—3069 Dundee Road 60062, (312) 272-4703: IBM, Apple, DEC, Osborne, Altos, Compaq, Software, Peripherals, Service.

THE SOFTWARE STORE—Glenview—1767 Glenview Road, 60025, (312) 724-7730. Microcomputer Software: Apple, IBM, CP/M, more. Special order Specialists! Open Mon.-Sun.

NILES—COMPUTERLAND—9511 N. Milwaukee Ave. 60646. (312) 967-1714: Apple, IBM Personal, Cromemco, Fortune, Osborne, Otrona: Software.

DATA DOMAIN OF SCHAUMBURG, 1612 E. Algonquin Rd., Schaumburg 60195. (312) 397-8700. 12-9 Mon.-Fri., 10-5 Sat. Authorized Sales and Service for Apple II, Apple III, LISA, Osborne and Alpha Micro Computers. Hewlett-Packard Calculators and accessories. Largest Book and Magazine selection in Midwest. VISA, MC, Amer. Exp. accepted for phone orders.

COMPUTERS ETC.—2515 West 147th Place, Posen 60469 (South Suburbs of Chicago). (312) 388-2000. Apple, IBM, Hardware/Software/Service. Complete learning center.

## INDIANA

INDIANAPOLIS—HEATHKIT ELECTRONIC CENTER, 2112 E. 62nd St., 46220, (317) 257-4321. Heath/Zenith Computers, Software, Peripherals, Service.

EMPRICE COMPUTER SYSTEMS INC.—5967 E. 82nd St., Indianapolis. (317) 842-8486. Atari computers, software, peripherals, games, accessories, classes.

## KANSAS

MISSION—HEATHKIT ELECTRONIC CENTER, 5960 Lamar Avenue 66202. (913) 362-4486 Heath/Zenith Computers. Software, Peripherals, Service.

GAME SHOP—Wichita 67201. Computer Software for personal computers. 7 days/week.

## KENTUCKY

SHELBYVILLE—SOUTHERN COMPUTER SYSTEMS—630 Main Street, 40065. (502) 633-5639. Microcomputers: Northstar, TRS-80, Kaypro, Basis 108, Atari. Peripherals: Okidata, C. Itoh, Smith, Corona, Corvus. Software: All major brands. Turnkey Systems, we service all major brands and peripherals!

LOUISVILLE—HEATHKIT ELECTRONIC CENTER—12401 Shelbyville Road, 40243, (502) 245-7811. Heath/Zenith Computers, Hero Robots, Software, Peripherals.

## LOUISIANA

COMPUTERLAND/LOUISIANA—312 St. Charles, New Orleans 70130. (504) 522-2255. IBM, Apple, Osborne, Fortune, Vector. #1 in service.

## MARYLAND

OLNEY COMPUTERS, 3414 First Ave., Olney 20832. Discount prices on Atari, NEC, Epson, Okidata, Commodore, Amdek.

BASIK COMPUTERS INC., 515 Firstfield Road, Gaithersburg 20878. (301) 840-0412. Epson HX-20 & QX-10, Franklin, Victor & others. Hardware, Software, Books & Supplies: Apple & IBM compatibles. Call for Discount prices.

COMPUTERS, ETC. ... 13A Allegheny Ave., Towson, 21204. (301) 296-0520; 9330 Georgia Ave., Silver Spring, 20910. (301) 588-3748, 257 West St., Annapolis 21401. (301) 268-6505. Cromemco, Osborne, Northstar, Sequa. Sales/Service/Training.

## MASSACHUSETTS

SCIENCE FANTASY BOOKSTORE—18 Eliot St., Harvard Sq., Cambridge 02138; (617) 547-5917. 11-6 Monday-Saturday till 8 Thursday. Apple, Atari, IBM and TRS-80 games.

THE GAME SHOP—ACTON, 427 Great Road (01720); (617) 263-0418. N.E.'s largest selection of Game/Recreational Software.

BURLINGTON/SOFT SUPPLY & SYSTEMS, 68 Middlesex Tpk., 01803. (617) 229-6666. Supporting, IBM, NEC, Digital, SEIKO, Chameleon.

SAUGUS—ROUTE 1. LAND OF ELECTRONICS. Walnut Place Shopping Center. (617) 581-3133. Apple, Altos—Hardware/Software/Peripherals. Service, Classes, Seminars.

## MICHIGAN

DETROIT—HEATHKIT ELECTRONIC—E. Detroit 48021: 18149 E. Eight Mile (313) 772-0416—Detroit: 18645 W. Eight Mile (313) 535-6480.

COMPUTERLAND—22000 Greater Mack Avenue, St. Clair Shores, 48080. (313) 772-6540. Altos, Apple, Compaq, DEC, Epson, Fortune, IBM, Osborne.

COMPUTER CONTACT—3017 East Hill, Grand Blanc 48439. (313) 694-3740. Apple, Altos, Software, Peripherals, Service. Business/Education/Personal.

COMTEC COMPUTER SALES—518 Adams Streets, Owosso, 48867. (517) 725-7326. For sales, service, consultation in IBM, Apple, Epson.

SOUTHFIELD—MICRO STATION SOFTWARE CENTER. A large selection of Software, Supplies & Peripherals. 24484 West 10 Mile, 48034. (313) 358-5820.

## MISSISSIPPI

COMPUTERLAND — IBM / OSBORNE / SOFTWARE / Training/Service/Books/Magazines. 1652 Highway #1 South, Greenville, MS 38701.

## MISSOURI

COMPUTER ANNEX—411 South Campbell, Springfield 65806. (417) 864-7036. Franklin, Epson, Hardware/Software, Service, Supplies, Classes.

COMMONWEALTH COMPUTERS—Blue Ridge Plaza, Kansas City 64151. (816) 356-6502. Indian Creek Shopping Center, Overland Park 64133. (913) 648-8086. Epson; Kaypro; Commodore; Onyx. Service. Training.

## NEW HAMPSHIRE

COMPUTER MART OF NEW HAMPSHIRE. 170 Main St., Nashua, 03060. (603) 883-2386. THE Apple Specialists. Full line Hardware/Software. Training/Service.

VIDEO STORE—140 Congress, Portsmouth 03801. (603) 431-1211. Osborne and Epson QX-10 for your business/home. Software. Supplies.

## NEW JERSEY

COMPUTERLAND OF CHERRY HILL—Pine Tree Plaza, 1442 E. Rt. 70, Cherry Hill 08034. (609) 795-5900. Apple, IBM, Fortune.

SOFTWARE MART—352 Bloomfield Avenue, Caldwell 07006. 201-228-4949. Software for Apple, Atari, TRS-80, 10-20% off list.

WAYNE SOFTWARE, 1459 Route 23, Wayne Tile Center, Wayne 07470, across from Packanack Center. Computers. Programs. Books. Peripherals. Discount Prices. 201-628-7318.

RED BANK—FELICE'S FOLLIES, 66 Broad St., 07701, (201) 842-2862. Atari, VIC20/64, TI99, Time/Sinclair, Hardware / Software / Peripherals-Demonstrations, Books/Magazines, Most Complete Micro Store in Monmouth County + Competitive prices.

BAYONNE: PARTS UNLIMITED, 433 Broadway, (201) 339-5009. Apple, Atari, Commodore, Altos, Olivetti. Peripherals, Software, Full professional support.

COMPUTERLAND/EATONTOWN—I.B.M.P.C. Compaq; Apple; DEC; Service; Leasing; Training; Software. 288 Route 35, (201) 389-2333.

PARSIPPANY—COMPUTER NOOK. New location!—160 Route 46 West, (201) 575-9468. Apple, DEC, Otrona. Sales/Service/Support.

ENTRE COMPUTER CENTER—312 Route 4 East, Paramus, 07652. (201) 342-0080. IBM, Digital, Teletivo, Osborne. ENTRE—"Your Logical Choice."

COMPUTERLAND, 35 Plaza, Rt. 4 West Paramus, 07652. (201) 845-9303. Apple, IBM, DEC, etc. We know small computers.

TRANSNET COMPUTER STORE—1945 Route 22, Union, NJ 07083. (201) 688-7812. 1111 Route 35 N., Ocean, NJ (201) 531-7020. Apple, DEC, TI, HP, Osborne + Hardware/Software/Peripherals/Accessories. Full on-site service. Training.

STONEHENGE COMPUTER CORP., 89 Summit Ave., Summit 07901. (201) 277-1020. 10-5:30 M-F, 10-5 Sat. Apple, IBM, Wicat. Authorized Dealer Sales and Service.

## NEW YORK

COMPUTER WORLD—6464 W. Quaker St., Orchard Park, 14127. (716) 662-4141. M-F: 9-9, Sat: 9-5. Atari, Commodore—VIC-20, 64. Epson HX20, QX10 computers, and printers. Hardware/Software.

COMPUTER DISCOUNT SERVICES. 448 West 55th St., New York, 10019. 212-757-8698. Timex Sinclair, Atari, Texas Instruments Hardware, Software, Peripherals.

LEIGH'S COMPUTERS, 212 East 85 Street, New York City 10028. (212) 879-6257. Apple, Atari, Franklin, VIC 20, Commodore 64, —Hardware/Software. IBM Software. All Peripherals. Discount prices.

PLATTSBURGH—U-COMPUTE, 582 Cornelia Street, 563-1679. Apple, Vector, Kaypro. School, Full Service Support, Full-Time Technician.

MERRICK—VIDEO CONNECTION, 27 Merrick Ave., (516) 546-5050. Atari, TI, Panasonic. Hardware/Software. Books/Magazines. Software try-out available!

STATEN ISLAND—S.I. COMPUTER CENTER, 1660 Richmond Rd., (212) 979-6263. Atari, Franklin, Epson, Xerox, Altos-Hardware/Software/Peripherals for Business and Home. Full Service/Training.

SOFTWARE EMPORIUM—151 Mineola/Willis Ave., Roslyn Heights, (516) 625-0550. LARGEST SELECTION OF SOFTWARE ON L.I.: Apple, Atari, TI, Commodore, IBM and more + hardware/peripherals/books/magazines.

BUFFALO—DEPEW. COMPUTER SYSTEMS, 4891 Transit Rd., (716) 668-5995. Complete line of Apple Computers, Software and Peripherals. Service and Classes!

FARMINGVILLE-DATASCAN COMPUTER SYSTEMS, 2306 N. Ocean Ave., (516) 698-6285. Atari, NEC, KAY-PRO, AP-LE Compatibles. Business Systems. Software/Peripherals/Service/Classes.

JERICHO—HEATHKIT ELECTRONIC CENTER, 15 Jericho Turnpike, (516) 334-8181. Heath/Zenith Computers, Software, Peripherals. Educational Classes.

WATERTOWN—MCDASNY COMPUTERS, Stateway Plaza, (315) 782-6808. Apple—Software/Peripherals. Full Service. Training is our specialty!

ALPHA STEREO—345 Cornelia Street, Plattsburgh 12901, (518) 561-2822. Atari computers and software. Weekdays 10-8, Sat. 10-6, Sun. 12-5.

COMPUTERWARE—2384 Hempstead Turnpike, East Meadow, 11554; (516) 731-7939. Large selection of Apple, Atari, Commodore software. Featuring business, utility and games. Call for the latest software releases. Authorized Franklin Ace service.

LEIGH'S COMPUTERS, 212 East 85th Street, NEW YORK CITY, (212) 879-6257. Apple, Atari, Franklin, Vic-20, Commodore 64—Hardware/Software. IBM Software. All peripherals. Discount prices!

## NORTH CAROLINA

HICKORY—SIMPLIFIED SOFTWARE, 118 Third Avenue, N.W., 28601, (704) 328-2386. Authorized Zenith Data Systems Dealer. Software for Z100, IBM/PC. Custom Programming.

## OHIO

ABACUS II—1417 Bernath Pkwy., TOLEDO 43615; (419) 865-1009. 4751 Monroe St. (419) 471-0082. 10-6, 10-9 Thursdays. IBM-PC, Epson, Apple, Osborne, Lisa.

BARNHART COMPUTER CENTER—548 N. Main, Urbana 43078. (513) 653-7257. ATARI, KayPro Portable, Columbia (IBM Compatible), Timex/Sinclair.

NORTH COAST COMPUTERS, 650 Dover Center, Bay Village 44140. 216-835-4345. 10-6 Mon-Fri, 10-8 Tuesday, 9:30-5 Saturday. Apple, Osborne, Vector Graphics, Altos.

TOLEDO—HEATHKIT ELECTRONIC CENTER, 48 South Byrne Rd., 43615, (419) 537-1887. Heath/Zenith Computers, Software, Peripherals.

COLUMBUS—HEATHKIT ELECTRONIC CENTER, 2500 Morse Rd., (614) 475-7200. Heath/Zenith Computers, Software, Peripherals, Robotics, Training.

AKRON—DATA MANAGEMENT SYSTEMS, 3979 W. Market St., (216) 666-3226. Atari, Commodore, OSI, NEC & more. Factory authorized dealer/repairs. Software development marketing, systems analysis.

NORTH CANTON—THE COMPUTER STORE, 116 7th St. N.W., 44720. (216) 497-0299. Franklin, Atari, Teletivo, Epson, IDS. Full Service/Classes.

COMPUTER CORNER—5104 Mayfield Rd., LYNDHURST 44124. (216) 473-5010. Commodore, NEC, SKS, Atari, Epson, Star. Hardware/Software/Peripherals. Authorized Service—Training/Classes.

## OKLAHOMA

TULSA—ABS COMPUTER CENTER—8518-E East 71st (74133), (918) 252-1604: Atari, Apple, Hewlett-Packard. Software, Peripherals, Training.

GAME SHOP—Norman, Stillwater, Oklahoma City, Tulsa. Computer Software for personal computers. 7 days/week.

TULSA—THE COMPUTER MART, 3003 E. 51st St., 74105. (918) 664-8452. Victor 9000, NorthStar, Atari—Hardware/Software/Peripherals/Supplies/Books/Magazines & Service!

## OREGON

CONTEMPORARY COMPUTERS—1478 Williamette, Eugene, OR 97401. KAYPRO, Chameleon, Vector Graphic, Altos, Molecular, NEC APC.

## PENNSYLVANIA

CALDWELL COMPUTER CORP., 6720 Rising Sun Ave. Philadelphia 19111. (215) 742-8900. Apple, Commodore, Percom, Zenith Sales/Service.

HARRISBURG AREA—1-STOP COMPUTER SHOPPE, 65 N. 5th St., LEMOYNE. (717) 761-6754. Full line dealers for Commodore, Osborne, Zenith. Software/Peripherals—Service/Training.

MARKETLINE SYSTEMS INC., 975 Jaymor Rd., Southampton, PA 18966. (215) 355-5400. We sell and service MicroComputers and peripherals. Related books/magazines available.

CITY SOFTWARE CENTER—2712 Grant Ave., PHILADELPHIA. (215) 969-3330. Largest selection of 3rd party software discounted up to 20%; Atari, Apple, TRS-80/III/II color, IBM, Commodore & more.

PERSONAL SOFTWARE, 146 Paoli Pike, Paoli, 19355. (215) 296-2726. Software Specialists. Custom Programs, Canned Programs and Peripherals.

SOFTWARE-N-STUFF—1111 Easton Rd., Warrington. (215) 343-3596. Franklin, Okidata Printers + largest selection of software in Bucks County!

## RHODE ISLAND

COMPUTOPIA, 653 North Main Street, Providence, RI 02906. (401) 274-0330. Computer and peripherals specialist. Full Service, Classes.

COMPUTRON—644 Elm Street, Woonsocket 02895. (401) 765-3037. ATARI, Commodore, TI, Timex/Sinclair, Gemini, Epson printers. Hardware/Software/Peripherals-Service/Training.

## UTAH

SALT LAKE CITY—SERVICE WEST OF UTAH, 3532 S.W. Temple, 84115. (801) 262-4069. Quality repair of all disk drives. Authorized ATARI Service.

## VERMONT

MONTPELIER, TIRONE'S INC., 22 Langdon Street 05602. (802) 223-6063. Atari, TI 99/4A. Peripherals, Software, Training. Authorized Atari Service Center.

## VIRGINIA

VIRGINIA BEACH, UNITED COMPUTER CENTER—IBM, Apple, Osborne, Vector Graphics, Olivetti, Alpha Micro, 2929 Virginia Beach Blvd. 23452. 804-340-1977; 1107 South Military Highway, 804-424-1075.

COMPUTERS, ETC ... 6671 Backlick Rd., Springfield, 22150. (703) 644-5500. Cromemco, Osborne, Northstar, Seeqa. Sales/Service/Training.

## WASHINGTON

COMPUTERS +, 2504 Jefferson Avenue, Tacoma, 98402. (206) 272-2329. Atari/Commodore Computers. Atari/Commodore/TRS-80 Software. Supplies.

SEATTLE—PROGRAMS PLUS, 16850 Southcenter Pkwy., (206) 575-1375. Apple, Atari, IBM, TRS-80, CP/M. Commodore—Software/Peripherals/Books. Open 7 days/wk.

CREATIVE COMPUTERS-KENT, 1415 West Meeker, 98031, (206) 854-7629; SEATTLE, 10732 Fifth Street, 98124, (206) 365-6502. ATARI, KAYPRO 2, FRANKLIN. Peripherals, software. SERVICE, TRAINING!

YAKIMA—ROB ROY COMPUTER SHOP—1109 West Yakima Avenue 98902. (509) 575-7704. Northstar, Atari, Software, Peripherals, Magazines.

## WISCONSIN

MILWAUKEE—HEATHKIT ELECTRONIC CENTER, 5215 W. Fond du Lac, (414) 873-8250. Heath/Zenith Computers, Software, peripherals, robotics.

MAGIC LANTERN, 406 South Park Street, Madison 53715. (608) 251-9112. Atari, Timex, Commodore, Texas Instruments. 700 programs in store.

## CANADA

ARKON ELECTRONICS LTD.—409 Queen St. West, Toronto M5V 2A5, (416) 593-6502. Apple dealer, Software/Hardware for Apple, Atari, VIC-20, TRS-80, and more. Books/Magazines. U.S. Inquiries.

SOFTACK SOFTWARE, 519 King Street West, TORONTO M5V 1K4, (416) 596-8911. Apple, IBM, Atari, TRS-80, CPM. Business/Education/Graphics/Games. Service and Training. U.S. Inquiries.

BYTE SHOP—VANCOUVER, 2151 Burrard Street, V6J 3H7. (604) 738-2181. Apple Authorized National Account Dealer. DEC, IMS, Morrows. Hardware/Software. Service/Training. U.S. Inquiries.

MICRO SHACK OF WESTERN CANADA—PARK ST., REGINA SK S4P 3N8. (306) 543-4079. Commodore Computers/Supplies, Epson Printers, Service/Training. VISA/MC accepted. U.S. Inquiries.

### DISCOUNT DISK DRIVES

100% APPLE COMPATIBLE	
<b>BOSS DRIVE</b>	<b>\$199</b>
<b>FOURTH DIMENSION</b>	<b>\$235</b>
<b>VISTA SOLO</b>	<b>\$245</b>
<b>VISTA DUET</b>	<b>\$330</b>
SINGLE D/S THIN W/CONTROLLER	
<b>VISTA QUARTET</b>	<b>\$650</b>
DUAL D/S THIN W/CONTROLLER	
<b>V1000 DUAL 8"</b>	<b>\$1249</b>
W/CONTROLLER	
<b>V1000 DUAL D/S 8"</b>	<b>\$1512</b>
W/CONTROLLER	
<b>V1000 DUAL D/S 8</b>	<b>\$1839</b>
THIN W/CONT.	
<b>V1200 6 MEG CART.</b>	<b>\$1203</b>
W/CONTROLLER	

WHOLESALE SUPPLIERS  
408-373-0320

### DISK DRIVE

FOR APPLE™ II  
ONLY **\$239**

VISA/MC OR M.O.  
CHECKS OK

415-221-3640

LWD SCIENTIFIC  
132 Clement St  
San Francisco, CA 94118



ONLY  
**\$19.95!**

### AMPOTRONIC JOY STICK FOR APPLE COMPUTER

- Self Centering
- 360° Cursor Control
- Full X-Y Coordinate Control
- 2 Firing Buttons
- 30 Day Money-Back Guaranty
- Dealer Inquiries Invited

Send check or money order for \$19.95 each plus \$2.50 for postage and handling. New York State residents add sales tax.

AMPOC ENTERPRISES, INC.  
5 BECKMAN ST. SUITE 720  
NEW YORK, N.Y. 10038

**\$450<sup>00</sup> WEEKLY**

working one or two  
hours a day with your  
personal computer.  
**GUARANTEED.** Simple  
program process. No  
special skills or ex-  
perience. Free

details/application.  
**BOND INDUSTRIES**

7115 Blanco Road  
Dept. 114-178  
San Antonio, TX 78216

### IBM® DISKETTES

5¼" Diskette 1D Single Side Double Density	5¼" Diskette 2D Double Side Double Density
<b>\$29<sup>00</sup></b>	<b>\$39<sup>00</sup></b>

Soft\* Box of 10      Soft\* Box of 10

\* Add \$1.75 for Plastic Library Case  
8" and other brands also available.



COD ACCEPTED  
DEALER INQUIRIES INVITED



**CALL TOLL FREE  
800-848-1101**

In N.Y.S. (716) 631-3925  
**BETSY BYTES Division**  
BB International, Inc.  
P.O. Box 564  
Buffalo, N.Y. 14221

TERMS: Prepaid orders receive free shipping within continental U.S.A. Add 3% (\$2.00 minimum) shipping and handling charge on all COD and credit card orders. N.Y. res. add 7% tax.

### CompuCover®



### COVER YOUR INVESTMENT

- Static Free
- Cloth Backed Vinyl
- Custom Fitted
- Clear Plastic

WE COVER ALL SYSTEMS  
FROM ADDS TO ZENITH

**1-800-874-6391**

ORDER LINE  
Dealer Inquiries Invited

CompuCover  
P.O. Box 324 Dept. B  
Mary Esther, FL 32569

Customer  
Service  
(904) 243-5793  
Telex 469783

CALL TOLL FREE

The First and Only System to Backup  
Diskettes Protected by Bad Sectoring  
without modification to your drive.



### ATARI DISK BACKUP SYSTEM \$49<sup>95</sup>

Superclone is the only ATARI diskette copier system that lets you backup just about ANY "copy protected" diskette... including those protected by "bad sectoring." Bad tracks and sectors are created without modifications to or adjustments of your hardware. Each backup diskette generated by Superclone functions exactly like the original... self-booting, etc. (In fact, we suggest that you use the backup and save the original.)

Superclone includes:  
SCAN ANALYSIS - Map of diskette contents (Location of data, bad sectors, etc.)  
FORMATTING/BAD SECTORING - Non-ATARI DOS formatting and bad track/sector creation.  
BACKUP - Copies just about everything we can find... regardless of protection scheme.

Superclone is user-friendly and simple to use.  
**PIRATES TAKE NOTE:** SUPERCLONE only allows two copies to be made of any specific diskette... Sorry!!!

#### SYSTEM REQUIREMENTS:

Atari 400 or 800 Computer / 48K Memory  
One Atari 810 Disk Drive / Printer Optional  
Available at your computer store or direct from  
FRONT RUNNER. DEALER INQUIRIES ENCOURAGED.  
**TOLL FREE ORDER LINE:** (24 Hrs.) **1-800-648-4780**  
In Nevada or for questions Call: (702) 786-4600  
Personal checks allow 2-3 weeks to clear.  
M/C and VISA accepted.  
Include \$2.00 (\$5.00 Foreign orders) for shipping.  
**FRONT RUNNER** - 316 California Ave., Suite #712  
Reno, Nevada 89509 - (702) 786-4600

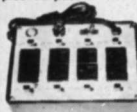
Others Make Claims... SUPERCLONE makes copies!!!  
ATARI is a Trademark of ATARI, Inc.

### POWER LINE PROBLEMS?



### SPIKE-SPIKERS™... The Solution!

Minimize equipment damaging spikes and conducted RF noise to or from sensitive equipment. Transient surge protection plus low pass RFI hash filtering. All units 120V 15A.



**MINI II \$44.95**

Wall Mount  
3-stage filter  
2 sockets

**QUAD II \$59.95**

Wall mount. Dual 3-stage filter  
4 sockets & light



**DELUXE \$79.95**

Dual 5-stage filtered  
ckts. 8 switch sockets  
main switch, fuse, light

**Kalglo Electronics Co., Inc.**  
65 84 Ruch Rd., Dept. C C  
Bethlehem, PA 18017

Order Factory Direct

**215-837-0700**

Out of State

**800-523-9685**

DEALERS INVITED

PA Res. Add 6% • COD add \$3.00 + Shipping

### TRS-80 COMPUTER DISCOUNTS

- Factory Direct
- Best Prices Anywhere
- No Out-of-State Taxes
- 100% Radio Shack Warranty
- Free Price List

### SCOTT TASSO ASSOCIATES

175 North Delsea Drive  
Vineland, N.J. 08360

**800-257-0426**

**NJ 609-691-7100**

**\$1,295.00**

**Z-80-6502**

**COMPUTER SYSTEM**

DISK DRIVE, DRIVE CARD, MONITOR

SYSCOM*	\$550.00
ORANGE*	\$650.00
FRANKLIN	CALL
GEMINI 10	\$375.00

Hayes	Incredible Jack	\$100.
Micromodem	Regular Drive	\$245.
Slimline Drive	Z-80 Card	\$100.
80 Col. Card	Syscom* Bare	
Cooling Fan	Board	\$55.
Disk Drive Card	16K Card	\$65.
Parallel Printer Card		\$65.

**!! WE WILL BEAT ANY PRICE!!**

Softsell Systems

9600 Roosevelt Blvd., Suite 100, LL

Philadelphia, Pa. 19115

(215) 665-5639

Radio Shack and TDP-100



**COMPUTERWARE®**  
Box 668 •  
6809 Specialists Encinitas, CA 92024  
(619) 436-3512  
Computerware is a trademark of Computerware

**DISKETTES**  
**maxell. VERBATIM**

100% ERROR FREE  
5% SS/DD

5% SS/DD

28.95

(BOX 10)

DATATYPE

5% SS/DD

24.95

(BOX 10)

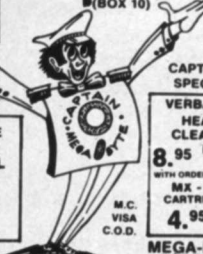


CAPTAINS SPECIAL

BUY ONE BOX MAXELL

GET 10% OFF

2nd BOX



CAPTAINS SPECIAL

VERBATIM

HEAD CLEANING

8.95 KIT

WITH ORDER OF DISKS

MX - 80 CARTRIDGE

4.95 EA.

MEGA-BYTE DEPT. CC

4899 S.W. 45th STREET

FORT LAUD. FLA 33314

305-587-1120

ADD 2.00 SHIP

5% TAX IN FLA.

800-327-1013

**DAISY WHEEL PRINTERS**  
**SMITH-CORONA TP-1**



**\$529**

- BROTHER HR-15(2 colors) ..... **SAVE**
- BROTHER HR-1(16k) ..... **\$749**
- DAISY WRITER 2000(48k) ..... **\$999**
- C-ITOH F-10(40 cps) ..... **\$1295**
- COMMODORE 64 Computer ..... **SAVE**
- OSBORNE Computer ..... **\$1595**
- SANYO MBC-1000(incl sftwre) ..... **\$1595**
- KAY-PRO II ..... **\$CALL**
- ZORBA ..... **SAVE**
- Wordstar/Spellstar/Mailmerge ..... **\$349**
- Franklin-Ace ..... **\$899**

**MICRO MART**

5375 Kearny Villa Rd #115, San Diego CA 92123  
(619) 268-0169

**★MICROCOMPUTER★**  
**BUSINESS SOFTWARE**

**MEDICAL MGMT...**  
**DENTAL MGMT...**  
**INSURANCE AGENT**  
**LEGAL BILLING....**  
**PROPERTY MGMT..**  
**AND MUCH MORE !**

UNIVAIR INTERNATIONAL  
9024 St. Charles Rock Road  
ST. LOUIS, MISSOURI 63114

(314) 426-1099

**VERSACALC!**  
**VERSACALC!**  
**VERSACALC!**  
**VERSACALC!**  
**VERSACALC!**  
**VERSACALC!**  
**VERSACALC!**

TUTORIAL UTILITIES  
AND FILE MANAGER  
ENHANCEMENTS TO VISICALC™

- SORT any number of rows, labels, values, formulas. You select the extent of the sort
- MENU—DRIVEN MODULES for your own application programs
- AUTO-CATALOG from within Visicalc
- CONDITIONAL TESTING to several levels
- AUTO SCREEN FORMAT saves hundreds of keystrokes
- PRINT OUT THE LIST OF COMMANDS
- AUTO BATCH UPDATE e.g. running year-to-date forms

YES! We said "SORT VISICALC!"

VERSACALC runs within Visicalc.  
Visicalc is a trademark of Visicalc Corporation.  
VERSACALC is a trademark of Versacalc Corporation.  
©1987 Versacalc Corporation. All rights reserved.

Apple  
Commodore  
IBM Personal Computer  
Apple II

Dealer Demo Disk Available

Anthro-Digital, Inc.  
103 Bartlett Avenue  
Pittsfield, MA 01201  
413-448-8278

**\$230.00**

**5 1/4 Apple™ Compatible Disk Drive.**

- Shugart SA390 mechanism custom analog card complete with Apple color case and cable.
- Completely compatible with Fortran; Pascal; CP/M; All Apple hardware and software.
- 90 day warranty / optional 15 month warranty available.

**HALF HEIGHT DRIVES FOR APPLE AVAILABLE!**  
**DIAGNOSTIC CONTROLLER CARDS \$95.00**

Send S.A.S.E FOR CATALOG TO:  
**D.A. COMPUTER PRODUCTS**  
3375 Woodward Ave.  
Santa Clara, CA 95050  
408-988-4408

\*™ M TRADEMARK OF APPLE COMPUTERS

**COMPUTER MART**  
**FORMAT**  
**2" X 3"**

**PICTURE YOUR AD HERE!**

**NEXT CLOSING DATE:**  
**AUG 3**



**DISKETTES**  
STARTING FROM

**\$1.85** EA.

- ✓ Free Hub Ring
- ✓ Improved Jacket
- ✓ 100% Error Free
- ✓ Superior Platter

**TO ORDER CALL**  
MI 1-800-632-2468  
US 1-800-258-0028



**Precision Data Products**  
P.O. Box 8332  
Grand Rapids, MI 49508-0332

# TIMEX-SINCLAIR

ZX81

1000



## 1983 Directory

- **Where to find:** Disk Drives, RAM Extensions, Printers, Modems, Keyboards, Game & Serious Software, Books, Periodicals, Programming Aids, and other Exciting Accessories!
- **Articles on:** Special applications like Control Circuitry, Enhanced Graphics, Voice Generation, Music Synthesis, Video Inversion, Light Pens, Joysticks, etc.
- **Complete Descriptions:** We'll tell you what it is, what it does, how much it costs, and where to buy it.
- **Jam-packed w/photographs:** We knew you'd want to see what these products look like. So, we got pictures and put them in!

**Only \$5.95 ... Postpaid!**

Sent First Class in the U.S.A.

**To Order:** Send check, money order, or VISA/MC number and expiration date. MN residents add 6% sales tax.

Dealer Inquiries Welcome.

**E. Arthur Brown Company**

Dept. TE-6 1702 Oak Knoll Drive  
Alexandria, MN 56308 Ph. 612/762-8847

WE COMPETE FEATURE-FOR-FEATURE WITH THE HIGHER PRICED WORD PROCESSING SYSTEMS—AND COME OUT THE WINNER!!

THE PROFESSIONAL'S CHOICE  
AMONG WORD PROCESSORS!



ONLY  
\$69.95

## The Magnificent WORD PROCESSING SYSTEM

For the TRS-80 Model I and III

ZORLOFF WAS GIVEN EXTREMELY HIGH RATINGS IN THE FEBRUARY ISSUE OF COMPUTRONICS AND THE MARCH ISSUE OF 80 MICRO. YOU CANNOT BUY A MORE FLEXIBLE, MORE POWERFUL, EASIER-TO-USE WORD PROCESSING PROGRAM FOR UNDER \$200. IF YOU DON'T AGREE, RETURN ZORLOFF WITHIN 30 DAYS FOR A FULL REFUND!

CALL (305) 259-9397

ANITEK SOFTWARE PRODUCTS P.O. BOX 1136  
MELBOURNE, FL 32935



Educational Programs for —

**ATARI, VIC 20, TI 99/4A  
TRS 80 Color Computer**

only **\$6.00** per cassette

Alphabet, Physics, Algebra,  
Weather, Planetary Positions  
and many others.

**Now!** Offering, also  
**SAT Preparation**  
(5 cassettes)

Write for free list:

**MOSES ENGINEERING**

P.O. Box 11038  
Huntsville, AL 35805  
Telephone (205) 837-3356

## COMPUTER—GRADE "SUPER" CASSETTES

SFM loads superior 5-screw housings with BASF PRO I-S (DPS) cassette tape to highest industry standards under constant quality assurance. Replacement warranty on all products. Cassettes labeled both sides and shipped bulk. **1-800-441-8854**

Hard Soft

C-10	C-20	Box	Box
12+	.55	.59	.15 .12



**SPECTRUM FIDELITY MAGNETICS**  
1770 Lincoln Highway East  
Lancaster, PA 17602  
717-295-9275

## TIMEX-SINCLAIR

MEMOCALC

Spreadsheet Analysis

MEMOTEK

ZX81 TS1000 TS1500 TS2000



Memocalc Spreadsheet (16-64K) .....	\$48.95
Memotext Word Processor (16-64K) .....	\$48.95
MemoAssembler (16-64K) .....	\$48.95
TIMEX-Sinclair "1500" Computer .....	\$74.95
TIMEX-Sinclair "2000" Color Computer	
16K .....	\$148.95
48K .....	\$194.95
TIMEX-Sinclair 2040 Printer .....	\$89.95
Seikosha 80 Char. Printer Pkg .....	\$339.95
(Incl. Parallel Interface & Cable)	
Memopak 16, 32, 64K RAM .....	\$48.95, \$89.95, \$138.95
Basicare 4 Megabyte System .....	Call or Write
Q-Save, Load/Save 6 Times Faster .....	\$38.95
Memotech Keyboard .....	\$89.95

**To Order:** Send check, money order, or VISA, MC number and exp. date plus \$2.00 shipping in the USA. MN res. add 6% sales tax.

Write For Our Colorful New Catalog!

**E. Arthur Brown Company**

Division TE-6 1702 Oak Knoll Drive  
Alexandria, MN 56308 Ph. 612/762-8847

## INTRODUCING COLUMBIA DATA PRODUCTS!

- IBM P.C. Compatible (A Cost Effective Alternative!)
- 128 K Memory!
- Includes FREE Software worth \$3000!
- Ideal for Professional/Business applications!

**ALPHATEX SYSTEMS**  
10905 Ft. Washington Rd.  
Ft. Washington, MD 20744

(301) 292-7330 or 301-248-1000

Call for free demonstration appointment!

## RIBBON CARTRIDGES

PRINTER MODEL (Contact us if your printer is not listed. We have ribbons FOR MOST PRINTERS)	NEW REPLACEMENT CARTRIDGES Price each in Qty.
	3 6 12
ANADIX 9500	12.00 11.50 11.00
CENTRONICS 704 (7-meg)	7.50 7.25 6.75
C. ITOH Prowriter	8.75 8.50 8.00
C. ITOH Starwriter	5.50 5.25 4.75
COMMODORE Pet 8023P	9.00 8.75 8.00
EPSON MX 70 / MX 80	5.50 5.25 5.00
EPSON MX 100	11.00 10.50 10.00
IDS Paper Tiger 460/560	7.75 7.50 7.00
NEC 5500/7700 Nylon	6.00 5.75 5.25
Multistrike	5.50 5.25 4.75
Multistrike High Yield	6.00 5.75 5.25
OKIDATA Microline 84	6.00 5.75 5.25
80, 82, 83, 92, 93	3.00 2.75 2.25
QUME Nylon	5.25 5.00 4.50
QUME Multistrike	5.00 4.75 4.25

CHECK, M.O., C.O.D., VISA or MASTERCARD

Free shipping pre-paid orders. VISA \$1.50 include expiration date. C.O.D. add \$3.00. Phone 6-9 pm Mon.-Fri. 9-5 Sat.

**ADEL COMPUTER MART** (302) 492-8463  
Dept. 60 Box 195 • Hartly, DE 19953

**2-Bit Software**  
**16 K QUALITY**  
**IN 2K MEMORY**  
FOR TIMEX/SINCLAIR COMPUTERS  
WITH OR WITHOUT MEMORY MODULE  
**FREE**  
COLOR CATALOG

2-BIT™ SOFTWARE, P.O. Box 2036  
Dept. CCD2, Del Mar, CA 92014  
(619) 481-3629

DEALER INQUIRIES INVITED



Low, direct prices • Fast, direct service

2532-450 .....	\$4.75
2716-450 .....	3.69
2732-450 .....	3.99
2764-250 .....	8.25
2764-350 .....	7.50
4164-200 .....	4.75
6116-P3 .....	4.30
6116-LP-3 .....	5.48

Add \$2.95 shipping to all orders

OEM • Quantity discounts available • P.O.s on approval • C.O.D. OK • Credit cards • FL residents add 5% tax • All new, no surplus, no seconds (Prices subject to change)

4920 Cypress St., Suite 100, Tampa, FL 33607

In FL, and for info., call 813-875-0299  
**FOR ORDERS ONLY, 800-237-8910**



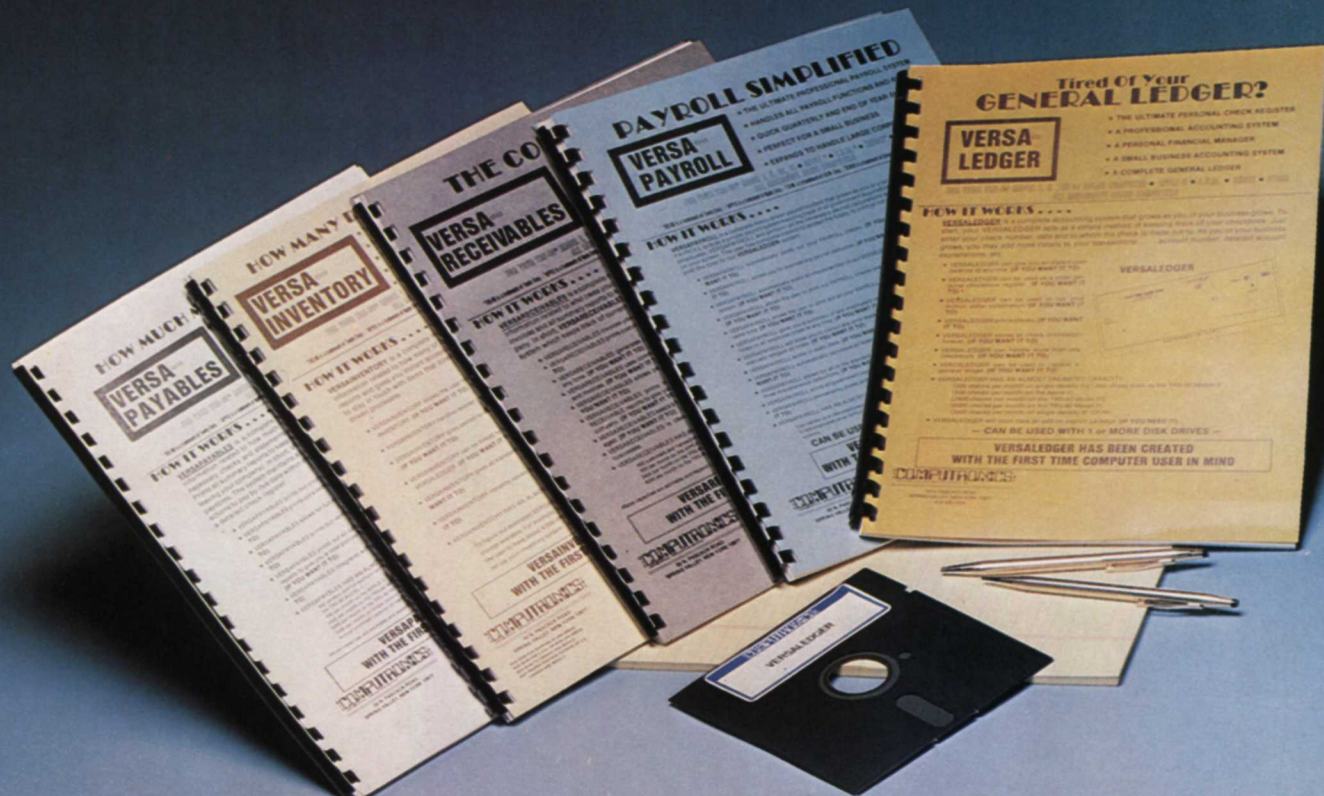
8AM-5PM EDT

# • index to advertisers •

Reader Service No.	Advertiser	Page	Reader Service No.	Advertiser	Page	Reader Service No.	Advertiser	Page
101	Aardvark	183	167	Electra Concepts Corp.	221	236	Pacific Exchanges	243
102	Abacus Associates	113	172	Electronic Specialists	239	236	Pacific Exchanges	235
103	Access Unlimited	111	141	Epson America	56-57	170	Peachtree Associates	243
105	Advanced Logic Systems	48	142	EPYX	148	173	Perry Oil & Gas Company	197
104	Adventure International	74	143	Executive Software, Inc.	51	174	Practical Peripherals	1
106	Adwar Video Corp.	219	144	Fastrack Computer Products	107	169	Programmer's Institute	137
	ALF Products	245	166	Finetech, Inc.	87	175	Protecto Enterprises	76-77
108	Allenbach Industries	21	168	Franklin Computer Corp.	122	177	Protecto Enterprises	175
287	Alpha Byte Computer Products	195	145	General Technology	179	176	Protecto Enterprises	101
107	Amdek	41	146	Gloucester Computer, Inc.	243	178	Quadram Corp.	30-31
234	American Micro	199	183	Happy Hands	211	251	Radio Shack	126
109	Apple Computer, Inc.	46-47	149	Harmony Video & Electronics	139	179	Red Baron Computer Products	191
110	Appleware, Inc.	239	189	Hayes Microcomputer Products	79	282	R.H. Electronics	16
111	Atlantic Computer Accessories	211	186	Hewlett-Packard	45	237	R.H. Electronics	17
119	Beagle Brothers	207	150	IBM Corporation	120-121	255	Roland Corp.	33
113	Blythe Valley Software	96	151	Inmac	186	180	Royal Software	247
147	The Book Co. (Continental Software)	187	196	Innovative Data Technology	54	185	Howard W. Sams & Co.	61
115	Broderbund Software	119	184	Ironsides Computer Corp.	193	182	Howard W. Sams & Co.	205
124	BRS/After Dark	145				187	Schoolmaster Programming Company	219
232	Cab-Tek	205	203	Kensington Microware	171	191	Sierra On-Line, Inc.	158-159
128	Calsoft	91	205	Kensington Microware	173	192	Sirius Software	23
116	Carolina Microsystems	106	188	Leading Edge	9	193	Snave Systems	215
136	Chrislin Industries	135	190	Leading Edge	C4	195	Software City	246
288 & 130	C-Load Magazine	124	158	L.N.W. Research	94	283	Software Models	187
118	Commodore Business Machines	39	202	L.N.W. Research	138	197	Software Pro Corp.	197
235	Com-Protect, Inc.	199	157	Lyben Computer Systems	219	199	Software Services	243
120	CompuServe	116	154	Lyben Computer Systems	243	254	Software T'Boot	186
121	Computer Advanced Ideas	29	159	Lycu Computer	130-131	261	Spectra Video	C2
122	Computer Discount Products	109	238	Magic Computer	70	259	Spectra Video	157
123	Computer Entrepreneur Publishing Company	217	209	Marymac Industries	118	206	Spinnaker Software	12-13
125	Computer Exchange	98-99	160	Master Computing, Inc.	43	200	SSM Microcomputer	133
126	Computerline	185	291	Memory Point	243	208	Star Micronics	71
129	Computer Mail Order East/West	168-169	239	M.F.S.	214	210	Strategic Simulations	151
131	Computer Outlet	200-201	211	Micro D	19	262	Strobe, Inc.	15
132	Computronics	C3	240	Micro Lab	66	286	Sydney Data Products	11
133	Comstar	228	223	Micro Learningware	219	213	Synapse Software	83
134	Cosmic Computers Unlimited	144	161	Micro Management Systems, Inc.	244	214	Synapse Software	115
135	Cow Town Software, Inc.	239	241	Micro Sales	214	215	Systems Group (The)	55
112	Creative Computer Peripherals	5	198	Municipal Information Systems	197	216	Systems Group (The)	172
138	Datamost	36	233	Muse Software	233	218	Tecmar	7
139	Datamost	93	224	National Computer Products	205	289	Texas Instruments	80
155	Datasoft	2		National Education Corp.	235	290	Texas Instruments	154-155
156	DDL Software	235	162	NEBS Computer Forms	187	279	Think Software	54
152	Designware	27	163	Nibble Notch	75	219	Tomorose	235
	Digital Equipment Corp.	160, 226	164	Nonagon	97	221	Transtar	69
140	Dilithium Press	73	165	Okidata	35	220	Transtar	225
229	Discount Data Supply	113		Omega Sales	59	222	Tronix	24-25
281	Dynacomp	167	271	Omni Resources	53	277	United Computer Corp.	63
171	Educational Media Associates	211	236	Pacific Exchanges	219	226	Universal Software	103
						227	Videx	65
						228	Warlock Software	75
						230	Winner's Circle	84
						231	Xerox Service Centers	89-89

# Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



## The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

### VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

### VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

### VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

### VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

### VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software.

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

### SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

#### To Order:

**Write or call Toll-free (800) 431-2818**  
(N.Y.S. residents call 914-425-1535)

- \* add \$3 for shipping in UPS areas
- \* add \$4 for C.O.D. or non-UPS areas

- \* add \$5 to CANADA or MEXICO
- \* add proper postage elsewhere

#### DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

# COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

\* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • \*APPLE is a trademark of Apple Corp. • \*IBM is a trademark of IBM Corp. • \*OSBORNE is a trademark of Osborne Corp. • \*CP/M is a trademark of Digital Research • \*XEROX is a trademark of Xerox Corp.

CIRCLE 132 ON READER SERVICE CARD

History will record as a profound irony  
that the most powerful word processing package  
ever created for the IBM® Personal Computer  
wasn't created by IBM.

## **LEADING EDGE.®**

Leading Edge Products Inc., Fortune 1300 Division, 21 Highland Circle, Needham Heights 02194 (800) 343-3436 (617) 449-6762  
Headquarters and Retail Division, 225 Turnpike Street, Canton, Mass. 02021 (800) 343-6833 (617) 828-8150

\*IBM is a registered trademark of International Business Machines Corporation.

**CIRCLE 190 ON READER SERVICE CARD**